

The Real Paradox: Untangling Credit Market Outcomes In Brazil

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BRAZIL — GOVERNMENT FISCAL YEAR

January 1 – December 31

CURRENCY EQUIVALENTS

1 USD = 2 BRL

(Exchange Rate Effective as of June 20, 2012)

WEIGHTS AND MEASURES

Metric System

ABBREVIATIONS AND ACRONYMS

BACEN	Central Bank
BCB	Central Bank of Brazil
BCBS	Basel Committee on Banking Supervision
BIC	Bayesian Information Criterion
BNDES	Brazilian Development Bank
BRIC	Brazil, Russia, India and China
CCB	Banking Credit Bills
CCT	Conditional Cash Transfer
CMN	National Monetary Council
CRC	Credit Risk Center system
COPOM	Monetary Policy Committee
CS	Convergence Statistics
CSLL	Contribuição Social sobre o Lucro Líquido
DSGE	Dynamic Stochastic General Equilibrium
FNE	Fundo Constitucional
GDP	Gross Domestic Product
ICA	Investment Climate Assessment
IFS	International Financial Statistics
IMF	International Monetary Fund
IOF	Tax Cuts on Foreign Transaction
IRPJ	Imposto de Renda Pessoa Juridica
I&R	Institutional and Regulatory
MCMC	Markov Chain Monte Carlo
NIM	Net Interest Margin
POS	Points of Service
PROER	Program of Restructuring and Strengthening of the Financial System
SCR	Central Risk System
SELIC	Special Settlement and Custody System (<i>Sistema Especial de Liquidação e Custodia</i>)
SEM	Structural Equation Modeling
SFN	National Financial System
SPC	Credit Protection Service
SWAP	Sector Wide Approach
VAR	Vector Auto Regression
VARX	Exogenous Variable

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THE REAL PARADOX: UNTANGLING CREDIT MARKET OUTCOMES IN BRAZIL

EXECUTIVE SUMMARY

1. **Over the past decade, credit markets in Brazil have markedly deepened.** Credit as a share of GDP almost doubled—from 28 percent of GDP in 2000 to 49 percent in December 2011, bank spreads almost halved, and access to credit has increased sharply for almost all market segments. Brazil’s sustained growth, rapidly rising per capita income, and expanded trade over the past two decades have cemented its status as a leading emerging economy.
2. **Today, some structural issues remain.** First, macro stabilization has increased the transmission of monetary policy to credit over the decade and micro reforms have reduced the cost of lending; however, credit demand remains quite inelastic to interest rates, indicating structural issues in some segments. Second, bank interest margins remain stubbornly high and supply shortages continue despite many improvements in Brazil’s credit environment. Third, micro factors now seem to dominate macro factors in affecting the cost and volume of credit; for many years, the reverse was true. Finally, consumers have benefited more than firms in terms of increased credit access and reduced spreads. Going forward, these paradoxes have implications for credit markets outcomes and policy formulation.
3. **This report reviews the performance of Brazilian credit markets over the past decade, which saw macro stabilization and microeconomic reforms with marked effects on credit market outcomes.** The report tries to distill the impact of those structural reforms and identify the remaining structural challenges. To address these issues, the report focuses on three main enduring paradoxes of Brazilian credit markets.
4. **First, how has the transmission of monetary policy to loan prices and volumes improved over the decade?** In particular, ten years (1994-2004) elapsed before credit volumes and prices started responding to the macro and micro reforms and the following years have seen increased responsiveness of credit aggregate to monetary policy.
5. **Second, why have Brazil’s interest rate spreads remained so high despite macro stabilization and micro reforms?** Do spreads in Brazil truly stand up by international standards? How has the relative contribution of macro versus micro determinants of spreads evolved over time?
6. **Third, why did access to credit for consumers expand so much while firms’ access did not?** Specifically, how have the micro determinants of firms’ demand for credit as well as banks’ supply of firm credit evolved over time.
7. **The report tries to answer these questions through the findings of eleven background papers that examine the three paradoxes from different angles.** By looking into these paradoxes, the report revisits the most prominent features of Brazil’s credit markets, sheds new light on the factors behind the observed outcomes, assesses how far Brazil has come, and

identifies implications for the future. The report does not provide a unified theory but rather specific findings that provide new results based on fresh data, new methodologies, and new insights from the research collaboration with the Central Bank of Brazil and Brazilian academics.

8. **The Eurozone countries' ongoing debt and financial crisis demonstrates the timeliness of better understanding Brazil's money and credit issues and the optimal path for the country's financial sector development.** Europe's troubles suggest market discipline is not infallible, and expanding financial access may have gone too far driven by financial excesses and bubbles (de la Torre et al., 2011). Brazil's resilience to the 2008 global financial crisis and so far to the unfolding Euro zone crisis demonstrates that the country's credits markets have come a long way over the past decade; however, much remain to be done to increase resilience, lower prices, enhance competition, and expand access across the board for consumers and firms. This report hopes to provide some insights on those challenges.

Main Findings

How has the transmission of monetary policy to loan prices and volumes improved over the decade?

9. **Improvements in monetary-policy transmission point to the relevance of key micro and macro structural reforms in setting the conditions for credit expansion over the decade.** Brazil achieved macroeconomic stabilization over the past decade. At the national and sub-national levels, the adoption of the fiscal responsibility framework, inflation targeting, and flexible exchange rates put an end to high inflation rates, high debt levels and public deficits, and fragility and volatility in external balances. State public banks were privatized—in particular, state banks plagued by recurring episodes of fiscal mismanagement. However, some less-pronounced institutional features remained, such as a dichotomy between on one side a proactive government banks that provide long-term financing for investment at subsidized interest rates and on the other side private commercial banks that account for the bulk of short-term credit, mostly consumer and working capital loans. This dichotomy has implications for the transmission of monetary policy as well as for further deepening of credit markets in Brazil.¹This dichotomy has also allowed Brazil to shore up credit supply during the 2008 global financial crisis. High reserves requirements were imposed to increase financial-system stability and remained until the global crisis of 2008. Debt renegotiations with subnational governments, along with the adoption of a fiscal responsibility law, effectively reduced deficit spending, and improved debt management and lower debt levels generated a crowding-in effect on credit.

10. **However, credit markets were slow to follow, with structural rationing characterizing most credit-market segments for much of the decade.** Even with major progress on the macroeconomic front during the 1990s and 2000s, credit remained low as a percentage of GDP until the mid-2000s. Surprisingly, 2004 marks the beginning of a huge expansion in credit—almost 10 years after reforms were first introduced with the 1994 *Plano Real*. The pillars of macro stability are introduced in the 2000s and micro as well as macro reforms continue throughout the 2000s. By 2010, credit had grown by about 80 percent compared to 2004 without additional major financial-deepening reforms. For many, the slow

¹ See forthcoming World Bank Study on Long Term Financing in Brazil.

reaction had a lot to do with bottlenecks in the transmission of monetary policy to economic activity during the decade.

11. **We look at three channels of transmission of monetary policy, namely the interest rate channel, the reserve requirements channel, and the reaction of loan demand to changes in the interest rates.** The main result shows increased responsiveness of banks to monetary policy in the second part of the decade, while loan demand remained quite inelastic. We find that the supply of loans is fairly elastic and demand elasticity varies by type of loan but is quite inelastic. Disaggregating by loan categories, consumer credit demand is much more inelastic than working capital demand. We also find that banks fully adjust corporate interest rates to a change in the monetary policy rate in the long run for all loan categories; however, short-term elasticity depends on the loan category.² We find that monetary-policy actions affect loan and time deposits rates, both in the long and short terms; but the effect on interest spreads is limited to the short term. Banks fully adjust the short-term lending rate to a change in the base rate, but this is not the case for time deposits. The evidence further points to interest rate stickiness on time deposits even in the long run.

12. **The study also presents new evidence that during the 2008 crisis, the reduction in reserve requirements acted as a countercyclical policy tool to provide short-term liquidity and improved liquidity distribution, increasing credit supply especially from large banks.** The lower reserve requirements boosted liquidity, increased credit supply, and supported consolidation in the banking sector, perhaps at the cost of decreased competition. The countercyclical use of reserve requirements contrasts with their role in the beginning of the decade. In 2004-2008, the role of reserve requirements was to foster stability through well-capitalized banks. During this period, high reserve requirements were blamed for Brazil's low credit/GDP level as well as its high spreads. However, the study finds reserve requirements did not impede the credit surge, suggesting that they are a second-order constraint on quantity but may still be a first-order constraint on spreads. Further research should assess the long-term impact of these developments.

13. **The study looks at the impact of micro reforms on credit and finds that payroll loans helped unleash credit, but their impact seems to be concentrated in specific borrower types.** Micro structural reforms and financial instruments implemented in the early 2000s were critical for the credit expansion observed in the second half of the decade. Reforms for improved information sharing, contract enforcement, and conflict resolution set the conditions for increasing credit supply and achieved important gains in expanding access and reducing the cost of credit, particularly in nontraditional segments of the market. Nevertheless, the results achieved were only partial in some cases and shortcomings remain. For instance, small transactions and small clients are unaccounted in the credit registry system. Payroll credit has been very successful in expanding credit access for public employees and pensioners, but it had a limited impact for private employees. The study finds that payroll credit enabled a dramatic increase in the amount of credit potentially available to pensioners, and that this credit availability is

² The disaggregation has the benefit of isolating effects within the loan category that may otherwise have been undetectable. Vendor loans have the highest short-term responsiveness to changes in interest rates. In contrast, short-term responses for working capital, personal loans, and purchasing goods other than vehicles are sticky. The difference in the pass-through may reflect average maturity, with transmission rising for loan categories with shorter maturities.

positively related to the probability of engaging in entrepreneurial activities. The results are particularly strong in relatively capital-intensive economic sectors like agriculture and ranching; they are not significant among relatively labor-intensive sectors, highlighting the limitations imposed by credit constraints on the Brazilian economy.

Why have Brazil's interest rate spreads remained so high?

14. **Brazil's high interest rate spreads have long been blamed on a high SELIC, however recent decline in the SELIC rate have shown otherwise.** Measured as the difference between lending and deposit rates, spreads rank among the highest in the world and reach up to 10 times international benchmarks. While high intermediation costs have long been blamed on the high SELIC rate, they remained high even after the SELIC fell to historically low levels since the 2008 global financial crisis. The pass-through of monetary policy, though improving over the decade, has in effect been limited as discussed above. The SELIC steady decline from 2004 onward, should have allowed for lower financing costs even under fixed spreads; however, average lending rates remained constant for corporate entities, with average spreads actually rising.

15. **Bank spreads reflect a wide range of micro, macro, and institutional factors and matter for policymaking.** Macro factors affect basic spreads because banks lend to a broad spectrum of firms and individuals, whose ability to repay is based on the health of the overall economy and their respective markets. On the other hand, specific taxes and provisioning rules raise the costs of bank operations, which are passed along to consumers through higher spreads. Spreads also increase because of the market structure of the banking sector, such as directed credit to priority sectors. In terms of social welfare, however, it is unclear whether high spreads are detrimental. A narrow spread may indicate that the banking market is very competitive, but it may also render the banking system less stable and less insulated from macroeconomic shocks because of low bank capital and low profitability. As spreads widen, on the other hand, the cost of interacting with the financial system becomes prohibitive to some borrowers and encourages riskier behavior in others. For these reasons, policymakers and central bankers care about the level and volatility of spreads and their determinants. In a financially liberalized environment, high bank interest spreads are an indication of inefficiency that may be detrimental to saving, investment, and growth. Many have argued Brazil has no apparent lack of profitable investment opportunities; rather, the country faces a high opportunity cost of capital that prevents new investments from being profitable (Hausmann, Rodrik, and Velasco, 2005).

16. **Brazil's high spreads have been mainly blamed on the high SELIC rate.** Three hypotheses emerge. First, it could be that the high SELIC stems mainly from debt and fiscal risks. Second, a multiple equilibria hypothesis suggests the SELIC is high because Brazil is trapped in an unfortunate equilibrium implied by a high risk of public debt default. In this scenario, fiscal rectitude has a positive impact on the sustainability of public debt and on reducing the SELIC level. As a result, macroeconomic debt fundamentals explain a large part of the SELIC rate. Furthermore, SELIC fluctuations are of a similar order of magnitude as fluctuations in the estimated default risk. Third, it may be that weak institutional factors create "jurisdictional uncertainty," pushing the SELIC higher. De la Torre et al. (2006), Afanasieff, Lhacer, and Nakane (2002), and da Silva, Oreiro, and de Paula (2006) find evidence that interest

rate levels and, to a lesser degree, the inflation rate are the main macroeconomic determinants of Brazil's high bank spreads.

17. **An analysis of the microdeterminants of spreads points us two a couple directions.** On one hand, the cross country empirical analysis of the microdeterminants of spreads finds that micro-level institutional and regulatory factors are, in fact, the dominant determinants of Brazil's high spreads. In 2009, for example, micro factors explained 79 percent of the spread, lack of banking competition accounted for 17 percent, and the remaining 4 percent was explained by macro factors. This represents a fundamental shift from previous findings that highlighted the importance of macro factors over micro factors. The consistent importance of micro factors and the persistence of high spreads during much of the period raise questions on the need to deepen institutional and regulatory changes. On the other hand the analysis of the determinants of bank interest rates in Brazil using loan by loan Brazilian Bank data indicates more granularity and pricing policies vary substantially depending on the market segment. In particular, microeconomic factors (market structure and banks' characteristics) ³ were important determinants of corporate loan or time deposit rates but not of retail loan rates. In addition, market concentration had a significant positive effect on loan rates and interest spreads

18. **The study's results on spread determinants imply there is scope to bring down the cost of financial intermediation by addressing institutional and regulatory factors that are imposed on banks and passed on to borrowers.** Interestingly, many of the findings at the disaggregated loan level are consistent with this new evidence of the first-order importance of micro factors as captured in reducing asymmetric information, increasing liquidity, increasing efficiency and competition in the banking sector, and reducing bank concentration.

19. **The study's investigation of bank-specific factors that drive the heterogeneity in pricing policies confirms that market concentration has a significant and robust positive effect on loan rates and interest spreads.** Banks with large market share are associated with higher loan rates and interest spreads. Higher concentration could indicate the most efficient banks have increased market share, leading to lower loan rates, but the findings show that oligopolistic behavior overrides the efficiency story. Concentration increased further after the financial crisis due to countercyclical measures supporting banking consolidation. We find that more efficient banks have lower lending rates for firms and higher time-deposit rates. Operational inefficiency and default rates on credit portfolios represent costs to the banks, and these factors influence banks' pricing decisions. We also find that higher delinquency ratios are associated with higher loan rates and interest spreads. As long argued, policies to screen ex-ante borrower quality and to monitor projects help decrease spreads.

Why did access to credit for consumers expand so much while firms' access did not?

20. **Firms' access to credit did not expand as much as consumers' access.** From profiles of borrowers and the terms on which they borrow, large shifts have occurred since 2005 to foster the expansion of access to and demand for credit, particularly by consumers. To understand why firms' borrowing costs remained high even though loan terms eased somewhat, the study looks

³ Bank characteristics are related to the default risk, interest-rate risk, administrative costs, liquidity level and banking service revenues.

at the micro determinants of firms' demand for credit and banks' supply of firm credit—and how these factors have changed over the decade.

21. **The study finds that credit rationing has long been a feature of Brazil's financial market, and loan shortages appear to have increased over time.** The study identifies gaps between volumes of credit supplied and demanded in Brazil and finds that the rise in demand for credit has on average exceeded the increase in supply. On the supply side, the study also finds the steady expansion of credit was dominated by private and undirected credit during 2004-2008 (a cyclical rise) and by public and directed credit thereafter (a countercyclical rise). Demand for credit has exhibited higher volatility, fluctuating more widely with economic activity. This has led to procyclical credit shortages, which have been relieved in times of crises.

22. **These shortages have remained much more pronounced for firms than for individuals mainly because of different risk perceptions.** The different effect between firms and consumers also reflects the specific risks and vulnerabilities associated to firms with respect to the vulnerability of their prospects to the business cycle. The analysis concludes that the main reason behind the access gap for consumers and firms has been the decrease in the risk of lending to consumers compared to firms. This is captured in the positive influence of collateral and credit history for the supply of bank credit to firms, which reflects decreasing information

23. **The study sheds some new light on the 2008-2009 crisis and finds that households' use of credit—especially formal credit—declined substantially, particularly among the poorer segments of the population.** Public banks' increased credit provision in response to the crisis may not have benefited consumers as much as hoped because financial use fell more in states with higher public bank deposits per capita. Similarly, credit use contracted less in areas with relatively low public bank participation, despite much steeper income reductions in those areas.

24. **The study finds evidence that firms' demand for credit is not very sensitive to lending rates.** This provides some clues to why spreads for firms did not diminish. If the demand does not react to the price of credit at least in the short term, then banks can continue to charge high spreads. This result has implications for the effectiveness of monetary policy, adverse selection, and moral hazard and, ultimately, for the health of the financial system and economic growth. The study finds, however, that longer loan maturities and the availability of collateral had positive impacts on demand. Firm characteristics are robust determinants of the demand for credit in some loan categories. Smaller firms have a preference for working capital loans, for example, and exporting status has a relevant and negative effect on the demand for discountable loans. We also observe an increased role for BNDES financing, implying that public directed credit crowded out private credit for all loan types except overdraft and goods acquisition. In some loans categories, some firms voluntarily exclude themselves from loans if they have alternative financing options.

25. **On the supply side, it appears that banks typically are more likely to lend when they can charge more.** Banks' real lending interest rates have a positive and significant effect on the supply of overdraft, goods acquisition, and vendor loans, while they are not significant for discountable and working capital loans. Collateral increases the supply of discountables and

working capital loans; however, the availability of collateral is not a significant factor affecting supply of other types of loans.

26. The results suggest that lending rates and loan maturity matter at the aggregate level; so do firm size, previous loans, macroeconomic conditions (i.e., GDP growth and inflation), and BNDES share in total credit. The lending rate negatively affects aggregate demand for new loans. Large firms have a lower probability of obtaining loans if they did not borrow in t periods preceding the new loan application. Once again, this is consistent with the fact that larger firms use more internal sources of financing. Prior credit relationships also matter: the total number of loans that a firm had in the past is positively correlated with new credit and is significant in all estimations. This result may reflect the importance of having a credit history to obtain a new loan.

27. The study also finds evidence of improving credit access for small firms over the past decade. While firm size mattered in the 2003-2006 period, size is not as important in the 2007-2009 sample. We also observe an increased role of BNDES financing—but with a negative coefficient, implying that publicly directed credit crowded out private credit for all loan types except overdraft and goods acquisition. The impact of cyclical downturns appears to be mitigated, signaled by the diminished significance of the GDP growth variable. However, firms that were already constrained—i.e., those already paying higher interest rates before the crisis—saw their costs increase disproportionately. During the crisis, interest rate penalties for new loans rose faster for firms borrowing larger amounts than for firms borrowing lesser amounts. At the same time, firms with a history of borrowing from a single institution fared worse than firms with prior credit from multiple sources. During the crisis, increased directed credit through BNDES helped maintain credit market liquidity at the aggregate level, but it appears that certain categories of small firms did not benefit. The analysis concludes that the main reason behind the access gap for consumers and firms has been the decrease in the risk of lending to consumers compared to firms. This is captured in the positive influence of collateral and credit history in the regression, which reflects decreasing information asymmetry. Banks perceive it less risky to lend to consumers than firms.

28. Going forward, Brazilian authorities are well placed to derive the appropriate implications of the study's findings—creating conditions for banks to better manage and assess firms' credit risk would help unlock firms' credit constraints. This could be done through expanding the reach of public and private credit registries, improving the quality of credit information, and enhancing collateral use. Implementation of recent legislation on positive credit is a step in that direction. The measure allows creditors to share consumer credit information on their obligations, which could provide positive signaling to allow access to better credit conditions. Another avenue could be the development of credit models that use the borrower-lender relationship to lower the cost of loans such as trade credits. Expanding the role of collateral promises clear benefits. For employees of private firms, the design of payroll loans needs to be reformed to strengthen repayment commitments in cases of employment termination by including a mechanism for transferring the responsibility of discounting the credit payments from the old employer to the new one. Standard policies on collateral are also worth pursuing. Some options include: (i) improving registry systems for movable and immovable assets, making it easier for agents to use property or assets that can be pledged as collateral; (ii) further improving the efficiency and reliability of the legal system for collateral claims in the event of

default by defining performance targets and rewarding good performers; and (iii) developing systems for collective collateral. Looking to the future of consumer and firm credit, technology provides the potential for new instruments. Electronic money—i.e., the use of cell phone-based technology to provide financial services—is a promising avenue for future expansion of credit and financial inclusion. Cell-phone penetration is very high in Brazil. Traditional commercial banks are moving ahead with it, recognizing large profit opportunities. Although the Central Bank is drafting a regulation to license non-bank financial service providers, further regulatory work is preventing e-money from expanding very far, despite its potential.

CHAPTER 1. RECENT CREDIT MARKET DEVELOPMENTS IN BRAZIL

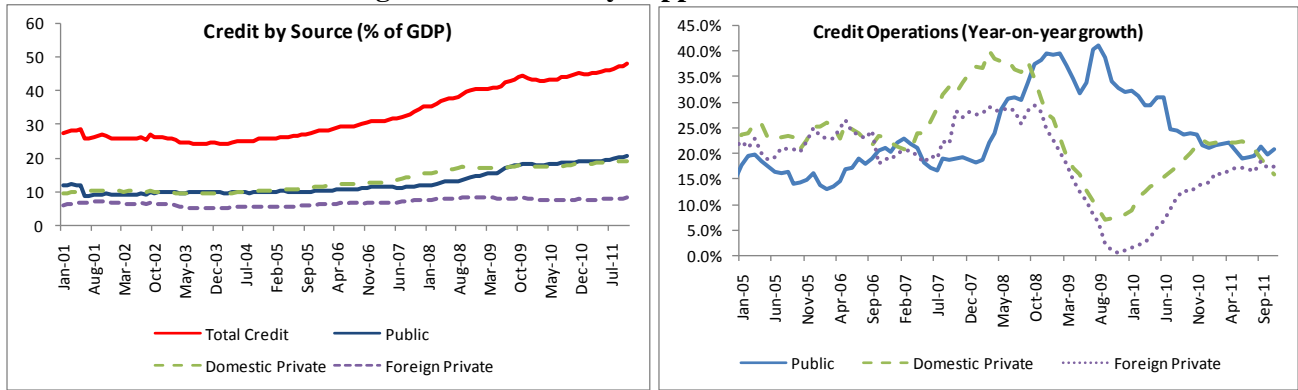
In this first chapter, we present stylized facts relevant for understanding the evolution of credit markets in Brazil. The chapter starts with aggregate credit trends, detailing the evolution of the main credit categories then moves to a discussion on the spreads, maturity, and loan terms. We also present some stylized fact about the macro economic framework and the factors that affect liquidity and reserves in the banking sector. We devote a section to the institutional framework with a discussion of the public banks. These stylized facts set the background for the subsequent chapters of the study.

1.1 This chapter provides an overview of recent developments in the Brazilian credit market and identifies a few questions that are addressed through the analysis. The report begins by presenting some stylized facts of credit in Brazil since 2000. From this starting point, the report launches into the structural, institutional, and policy aspects of the credit story with respect to the macroeconomic context (Chapter 2), microeconomic factors (Chapter 3), the cost of credit (Chapter 4), and credit access (Chapter 5).

Aggregate Credit Trends

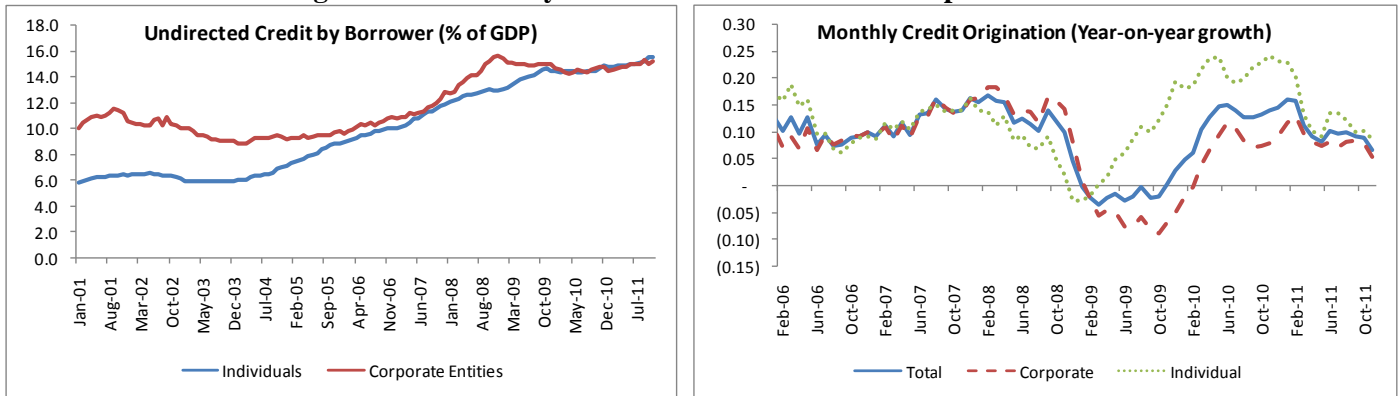
1.2 Brazil's credit markets have grown substantially over the past decade, especially from the middle of the decade onward. Total credit as a share of GDP nearly doubled from 25.7 percent in 2004 to 49.1 percent in December 2011. Historically, Brazil's credit penetration was low. The recent spurt has brought the country closer to other emerging markets. Credit expansion took place in two sub-phases: 2004-2008 driven by consumer lending, and 2008-2010 led by public banks lending. Private-sector credit growth dominated the first phase; the public financial system led the expansion in the second phase. Private credit as a share of GDP grew gradually from about 15 percent in 2004 to more than 25 percent in 2008. After that, it stabilized; reaching 27 percent of GDP by 2011 (see Figure 1.1). The rapid expansion during 2004-2008 largely came from increases in non-earmarked (undirected) domestic credit. It grew for both individuals and corporations, with a steep catch-up in access by individuals during 2001-2005 (see Figure 1.2). The public financial system's growth took off after 2008, with the expansion of earmarked (directed) credit by BNDES, BB, Caixa, and other public banks. And yet, the majority of creditors were in the private sector.

Figure 1. 1: Credit by Supplier: Public vs. Private



Source: BCB

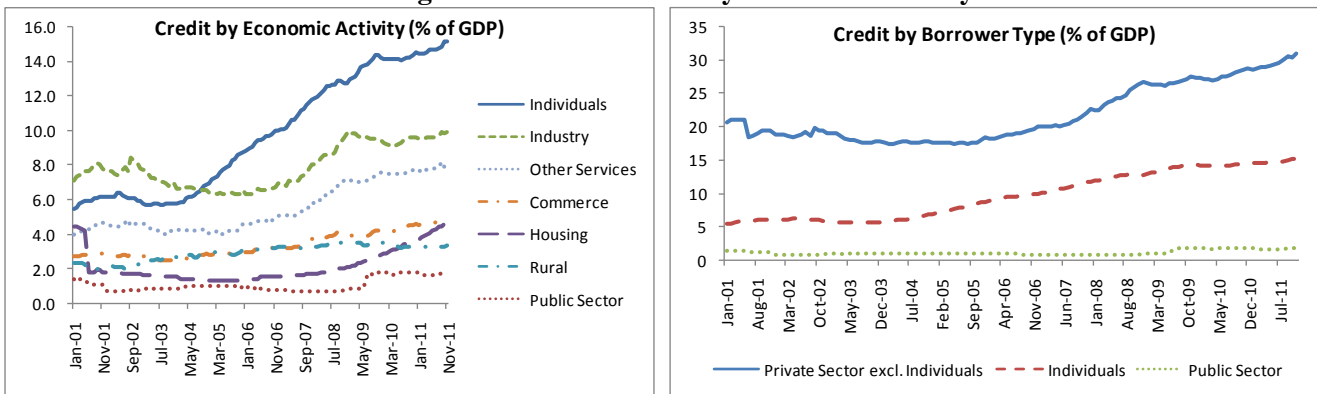
Figure 1. 2: Credit by Borrower: Individuals vs. Corporate Entities



Source: BCB

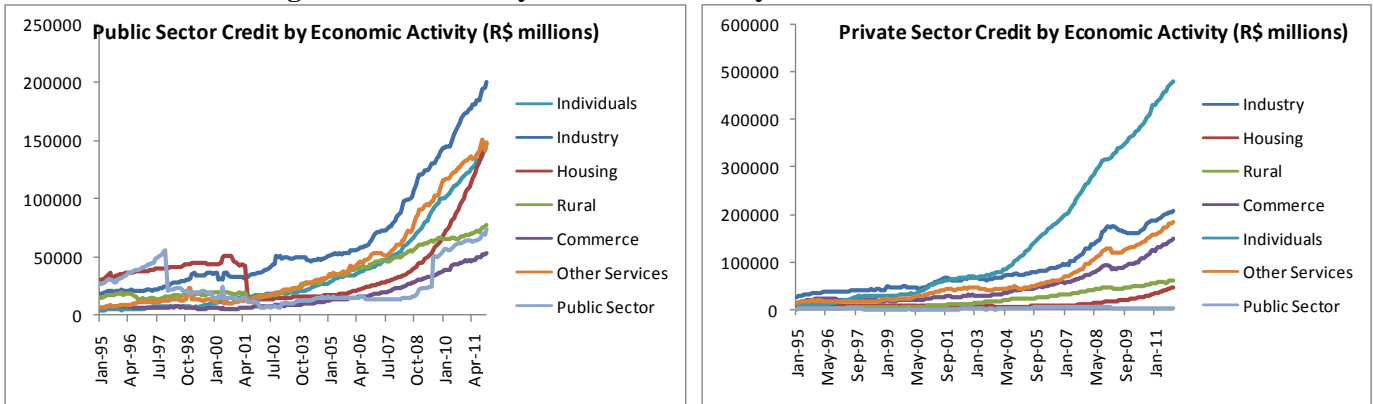
1.3 **The private sector is the main borrower, with firms accounting for almost double the credit used by individuals** (see Figure 1.3). A more detailed look at the allocation of credit shows the sharp rise of individual borrowers in recent years. Among business sectors, industry, services and commerce are the leading users of credit. Public credit is directed primarily at industrial sector firms, other services and housing, although individuals still account for a large share of public credit (see Figure 1.4). Private credit, by contrast, is primarily directed to individuals.

Figure 1. 3: Total Credit by Economic Activity



Source: BCB

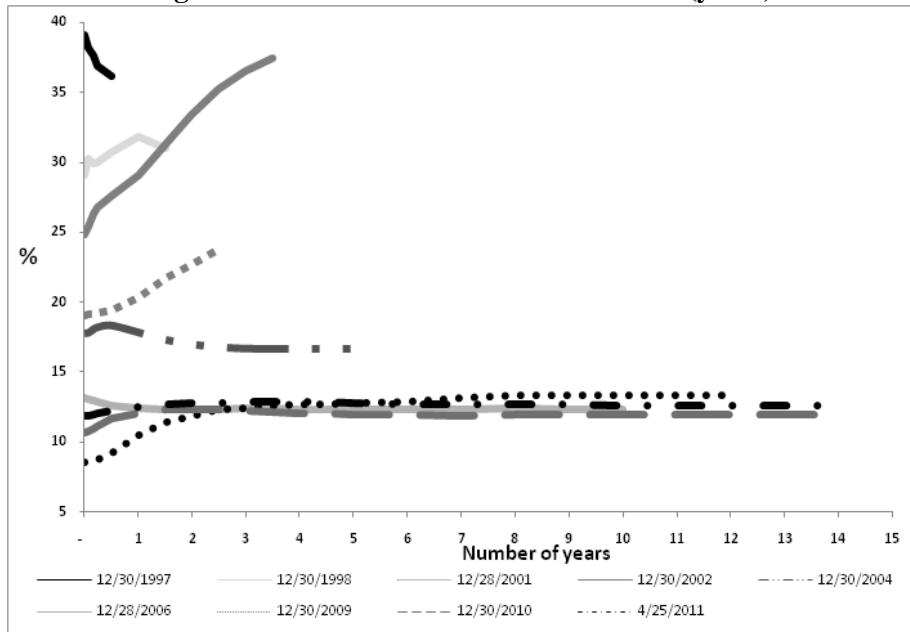
Figure 1. 4: Credit by Economic Activity: Public vs. Private Sectors



Source: BCB

1.4 **The improvement in the term structure of interest rates⁴ in the past decade reflects stabilization from the mid-2000s.** In the late 1990s and early 2000s, the yield curve was upward sloping, very short at one to two years, and a product of very high rates of 25-30 percent in the overnight market (see Figure 1.5). The steep yield curve in 2002 meant that banks could only fund themselves at very short maturities and extremely high rates. Both banks and firms faced difficulties in planning; the short maturity of loans had negative consequences on firms' growth prospects.⁵ Moreover, credit supply was very low despite the extremely high lending rates. From 2006 onwards, the yield curve flattened, becoming horizontal and very long at 14 years, with significantly lower overnight interest rates.

Figure 1. 5: Interest Rates Term Structure (years)

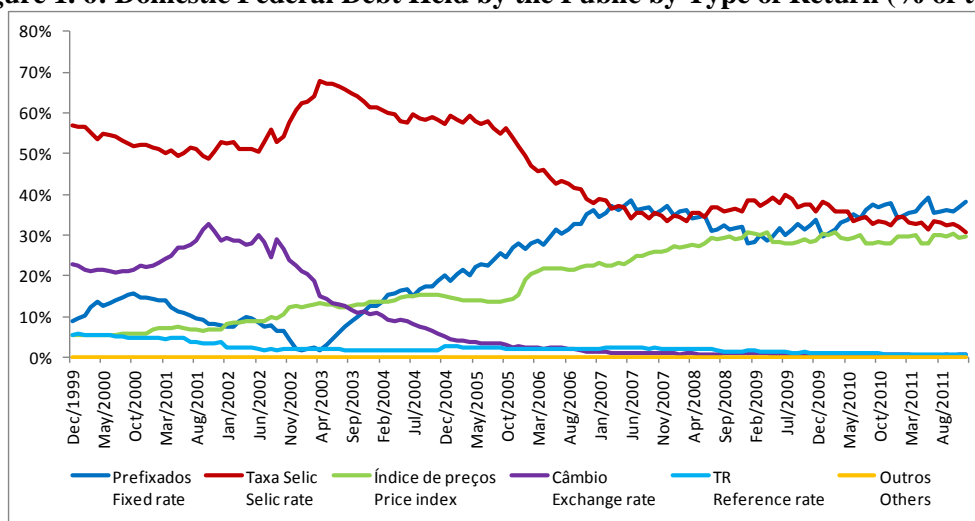


⁴ As measured by DIFut from BM&BOVESPA.

⁵ See Haussman, Rodrik and Velasco (2005).

1.5 The relative decrease in bank holdings of government debt securities indexed by the SELIC (*Sistema Especial de Liquidação e Custodia*) increased the effectiveness of monetary policy tools. The composition, structure, and maturity of domestic government debt securities have improved considerably (see Figure 1.6). Banks' holdings of floating-rate domestic government debt fell from more than 50 percent of all securities in January 2002 to around 30 percent in December 2011. Higher shares of floating-rate securities had meant that SELIC increases would benefit banks, giving them less reason for restraint. The decrease in the share of floating-rate government securities also reduces the need to lengthen the yield curve by indexing on the overnight rate and shows to some extent the commitment of the government to maintain fiscal, monetary, and social stability. Fixed-rate domestic government debt has steadily grown from less than 7 percent in 2002 to more than 38 percent in December 2011. Inflation-linked instruments increased from around 15 percent to nearly 30 percent, reflecting the demand from institutional investors with inflation-indexed liabilities. Average maturity increased from 26 months in 2006 to nearly 40 months in December 2011. At first, the maturity declined from 2002 to 35 months in January 2002. The relative share of US-dollar indexed instruments declined from around 25 percent in early 2002 to less than 1 percent at the end of 2011.

Figure 1. 6: Domestic Federal Debt Held by the Public by Type of Return (% of total)



Source: BCB

1.6 The sources of liquidity in the money market have shifted over time affecting the funding of Banks and the impact of reserve requirements as a monetary policy tool. The main factors increasing or decreasing the liquidity available to banks from January 2007 to March 2011 differ in time: Pre-crisis—before March 2008: Until a few months before the outbreak of the global financial crisis, liquidity came mostly from Central Bank foreign-exchange operations. Bank reserve requirements played a very limited role of draining liquidity from the market. Crisis—from September 2008 to January 2010:⁶ Fiscal policy appropriately turned countercyclical with government receipts declining and expenditures increasing. The SELIC was eased and corresponding net redemptions of Treasury securities increased from R\$136 billion in September 2008 to R\$319 billion in January 2010. Post-crisis—from January

⁶ The first date marks the Lehman Brothers collapse and the end date corresponds to the resumption of using reserve requirements as a tool to drain liquidity from the market.

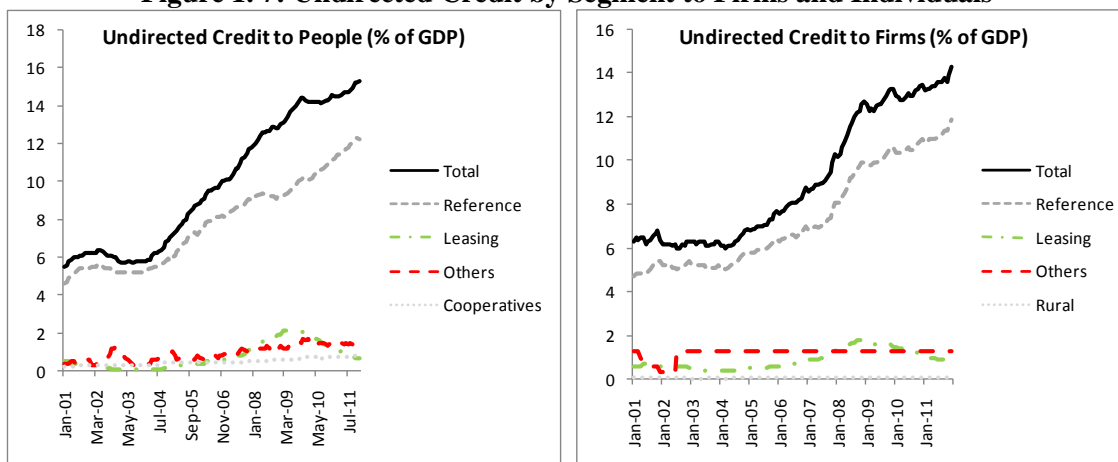
2010: Currency appreciation prompted an increase in the Central Bank foreign-exchange operations from R\$209 billion in January 2010 to R\$325 billions in March 2011. Net redemptions of Treasury securities continued, increasing to R\$363 billion in March 2011. Government receipts and expenditures also increased their share of market liquidity as fiscal accounts deteriorated. The government stepped up its use of prudential measures through higher reserve requirements. They went from contributing R\$43 billion of increased liquidity in March 2010 to draining R\$215 billion in March 2011.

1.7 The evolution of banks' reserve composition reflects the dynamics of fiscal and monetary policy. The share of government securities in banks' holdings more than quadrupled from 2009 to the first quarter of 2011. The share of foreign currency increased from near-zero in January 2009 to an average of R\$30 billion in 2009, R\$70 billion in 2010, and R\$135 billion in the first quarter of 2011. This reflects capital inflows arising from the interest rate differential between Brazil and the developed world, the increase in reserve requirements, prudential measures, and tax increases on financial transactions.

Borrowers

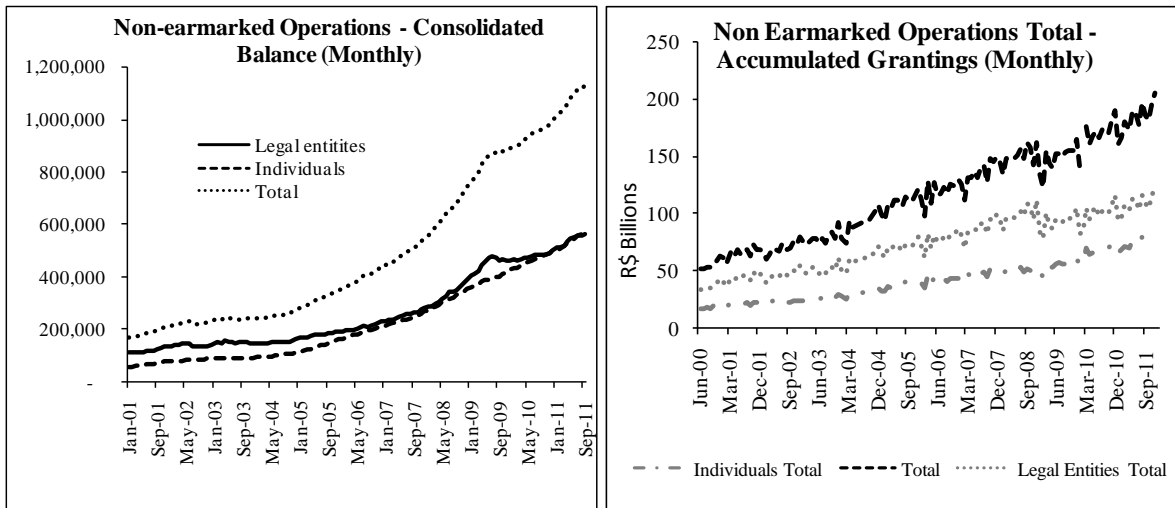
1.8 Borrowers can be disaggregated by type—i.e., consumers vs. firms – and by type of credit—e.g., overdraft, housing loans, car loans, trade credits, working capital loans. Furthermore, credit can be earmarked for certain priorities, or undirected, available for the borrower's chosen use. Earmarked credit is a prominent feature of public-sector lending, while undirected loans dominate private lending. Since 2004, undirected credit has risen steeply, both as a share of GDP and in levels. This steep growth has been observed for both firms and individuals, with greater volatility for firms (see Figures 1.7 and 1.8). It is worth noting that for private banks firms and individual growth have grown roughly along the same lines. Figure 1.9 shows that growth in firm credit has been driven by working capital, guaranteed overdraft accounts, and the residual other operations category. Working capital in particular stands out in terms of its high growth during 2008-2010. This raises questions about the impact of credit in spurring economic growth. Financing working capital, for example, may enable firms to keep functioning at some level, but would not allow longer-term investment in expanding capacity and employment that could make a greater contribution to economic growth.

Figure 1. 7: Undirected Credit by Segment to Firms and Individuals



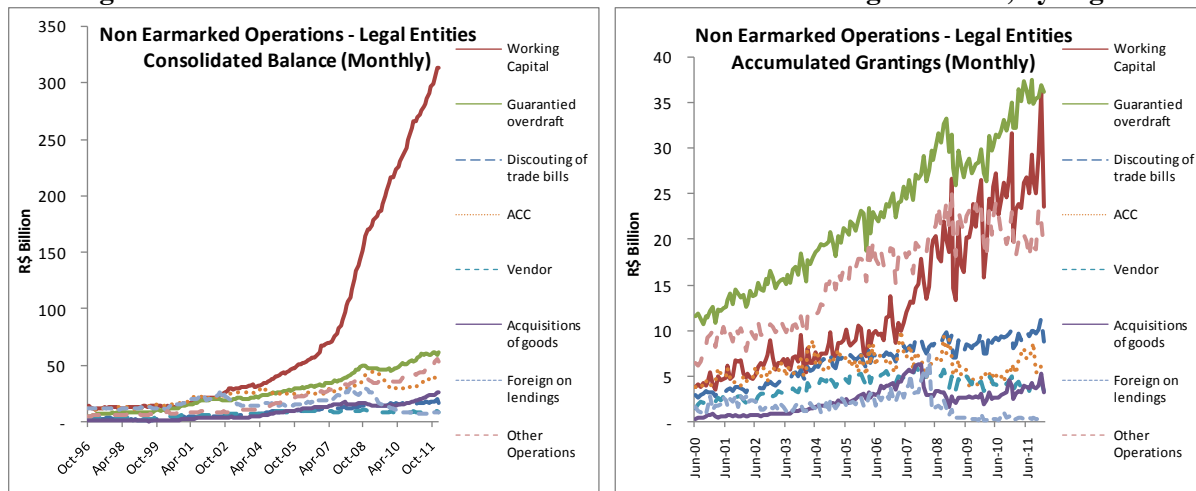
Source: BCB

Figure 1. 8: Non-Earmarked Consolidated Balance and Grantings to Firms and Individuals



Source: BCB

Figure 1.9: Non-Earmarked Consolidated Balance and Grantings to Firms, by Segment

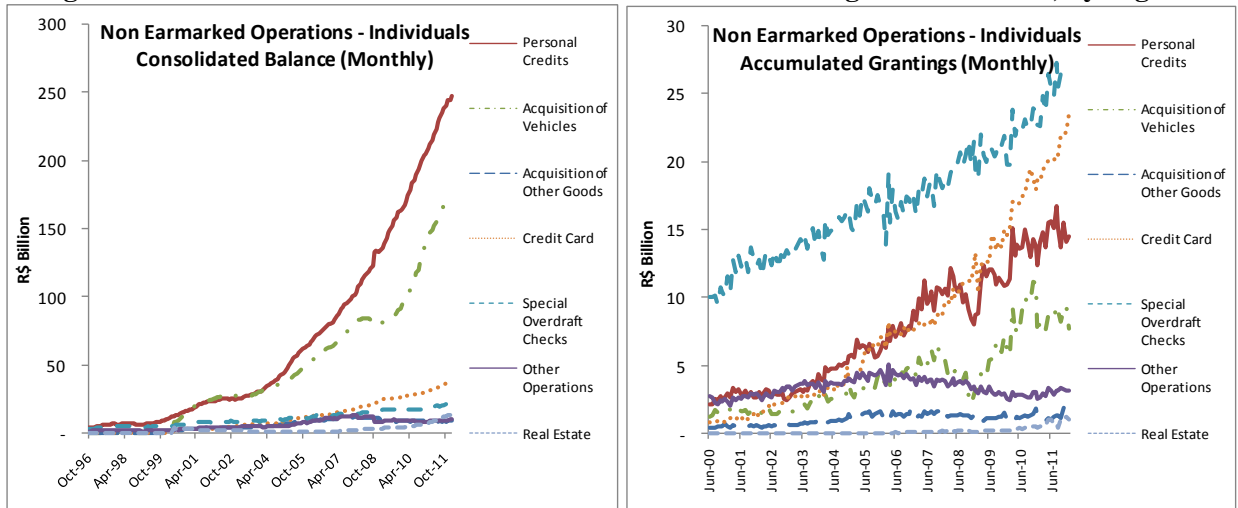


*Note: Other Operations by Legal Entities includes Hot Money, Discounting Promissory Notes, Real Estate, Export Notes, and Other Operations categories.

Source: BCB

1.9 For consumers, personal credits and the acquisition of vehicles were the dominant reasons for household borrowing since 2004. But credit-card debt and special overdraft checks became increasingly important during 2008-2010, pointing to the consumption-smoothing function of credit during the economic crisis (see Figure 1.10).

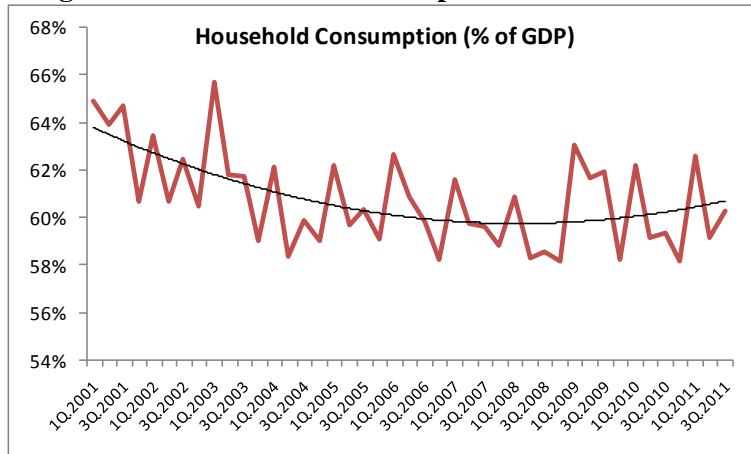
Figure 1.10: Non-Earmarked Consolidated Balance and Grantings to Individuals, by Segment



Source: BCB

1.10 The rapid expansion in household borrowing is most likely linked to both macroeconomic and regulatory factors. Figure 1.11 show that household consumption as a share of GDP also grew as the macro stabilization program took root in 2005 and the economy began its sustained period of rapid GDP growth (see Chapter 2 for further discussion). At the same time, regulatory changes may have fostered the uptake of new types of loan products by households, contributing to the sharp rise in the stock of personal loans (discussed in detail in Chapter 5).

Figure 1.11: Household Consumption as a share of GDP



Source: BCB

Credit Supply and Interest Rate Spreads

1.11 Brazil's financial system is large by regional standards, but financial depth has been relatively low. Prior to the recent period of macroeconomic stabilization and robust economic growth, only about a third of the population had bank accounts, far below the potentially

“bankable” one-half of the population. According to Kumar (2005).⁷ Thirty percent of municipalities lacked a bank branch – and a much higher proportion in the northern regions. Credit cooperatives offered basic services to some 1.5 million mostly urban residents, but many rural citizens were excluded altogether. With respect to more sophisticated financial services, penetration was very low.

1.12 By 2010, commercial bank branches and cooperatives reached an increasing proportion of Brazil’s population. The country had 14 commercial bank branches per 100,000 adults—on par with countries with similar incomes but below the LAC region average of 16. The number of municipalities lacking a bank branch had fallen to 247 in 2010, down from 1,680 in 2004. The traditionally underserved northern region was a particular focus of expanded financial services provision. ATMs and points of service (POS) exploded during this period. The penetration of ATMs and POSs in Brazil doubled the LAC average in 2009 (Table 1.1).

Table 1. 1: 2009 Penetration Comparison of ATMs and POS

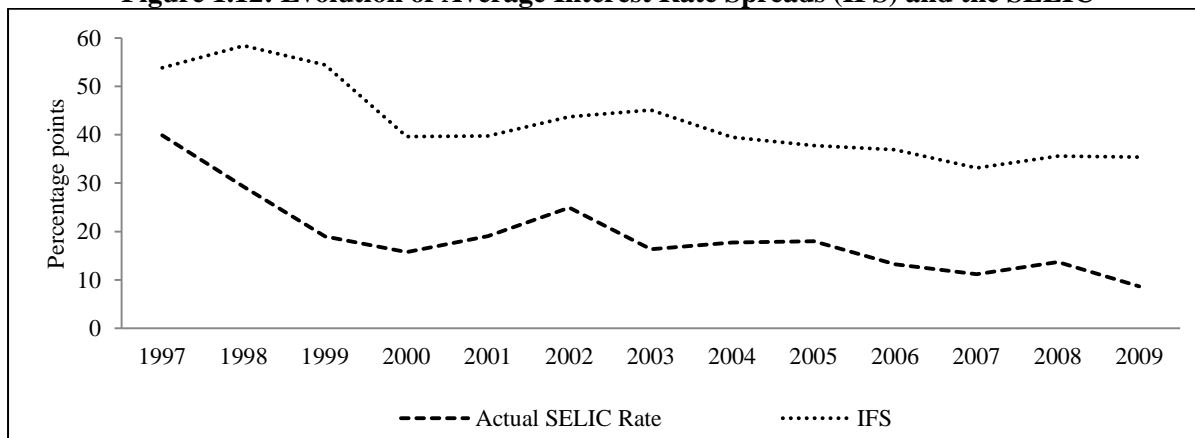
(per 100,000 inhabitants)	ATM	POS
Brazil	112.1	2,247.40
Europe & Central Asia	41.9	635.10
Sub-Saharan Africa	11.7	5,695.10
East Asia & Pacific	38.7	510.20
Latin America & Caribbean	49.4	1,119.70
South Asia	5.2	39.60
Middle East & North Africa	17.8	608.60

Source: World Bank Financial Statistics Database

1.13 Brazil’s banking system has long been characterized by very high interest-rate spreads—the gap between deposit and lending interest rates. The large spreads reflect a high cost of financial intermediation. Using the IMF IFS definition, interest-rate spreads have declined from more 50 percent in the late 1990s to around 35 percent in 2009 (see Figure 1.12). However, Brazil’s spreads remain far above average spreads in the LAC region and in BRIC countries (see Figure 1.13). Table 1.2 indicates that Brazil’s average bank spreads were triple the LAC regional average in 2000-2006, five to six times the average in developing countries, and even greater when compared to developed countries.

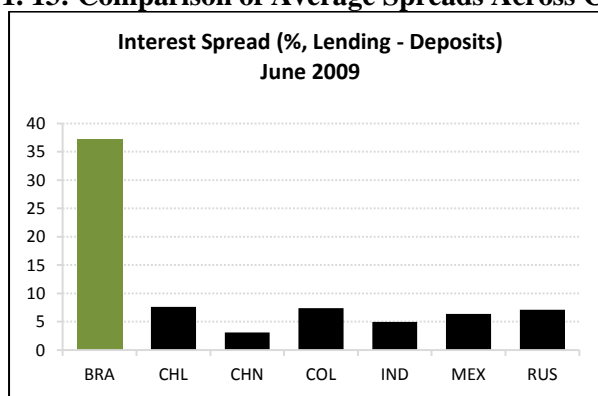
⁷ “Access to Financial Services in Brazil”, by Anjali Kumar, World Bank (2005).

Figure 1.12: Evolution of Average Interest Rate Spreads (IFS) and the SELIC



Source: Banco Central do Brasil, BankScope and IMF (IFS)

Figure 1.13: Comparison of Average Spreads Across Countries



Source: IFS, IMF

Table 1. 2: Bank Spreads and Financial Depth: International Perspective

Table 1 Bank interest spreads and financial depth worldwide, average 2000–2006					
Variable	Brazil	Latin America (19)	Other developing (46)	Developed (24)	Sample (90)
Bank spreads (percentage points)					
Over deposit rate	31.3	9.6	6.8	3.6	6.8
Over interbank rate	30.3	9.1	5.1	2.6	5.5
Over treasury bill rate	30.3	7.6	5.4	2.6	5.4
Financial depth (percent of GDP)					
Private credit	17.2	32.6	42.8	108.8	58.1
Private debt market capitalization	10.1	7.6	17.0	44.7	30.6
Stock market capitalization	41.1	25.6	47.2	90.4	55.7

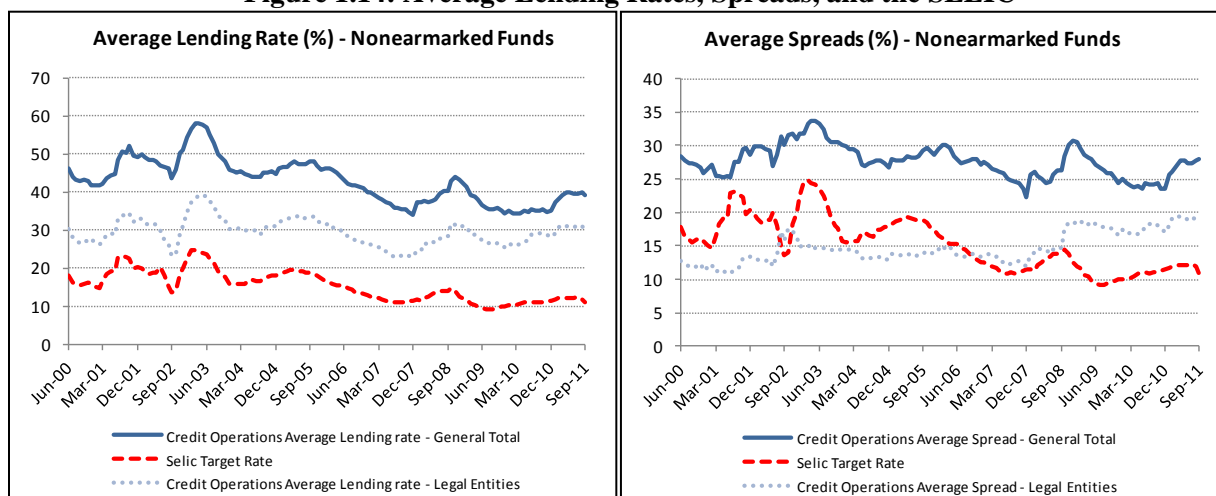
Figures in parenthesis are the number of countries in each group.
 Bank spread: difference between the average lending rate and the corresponding interest rate
 Private credit: loans by commercial banks to the private sector. Brazilian figures refer to freely allocated loans
 Private debt market capitalization: private domestic debt securities issued by corporations and financial institutions
 Stock market capitalization: value of listed shares
 Original sources: Global Financial Data, IMF's IFS, Beck et al. (2000) and central banks

Source: Souza-Sobrinho (2010)

1.14 **These stylized facts raise the following question: Why is Brazil an outlier, even compared to Latin America, a region with higher spreads than most of the rest of the world?** We might expect robust economic outcomes since 2000, and particularly since 2004, to bring spreads closer in line with international averages—but they did not.

1.15 **Evidence suggests that declines in the reference interest rate, or SELIC, were translated into both lower lending rates and lower average spreads.** Average lending rates have fallen for loans to individuals but remained more or less constant for firms, reflected by the narrowing gap in Figure 1.14. Although interest rate spreads have also declined, they remain stubbornly high compared to other emerging markets. The average spread for firms has actually increased since 2005 see Figure 1.14.

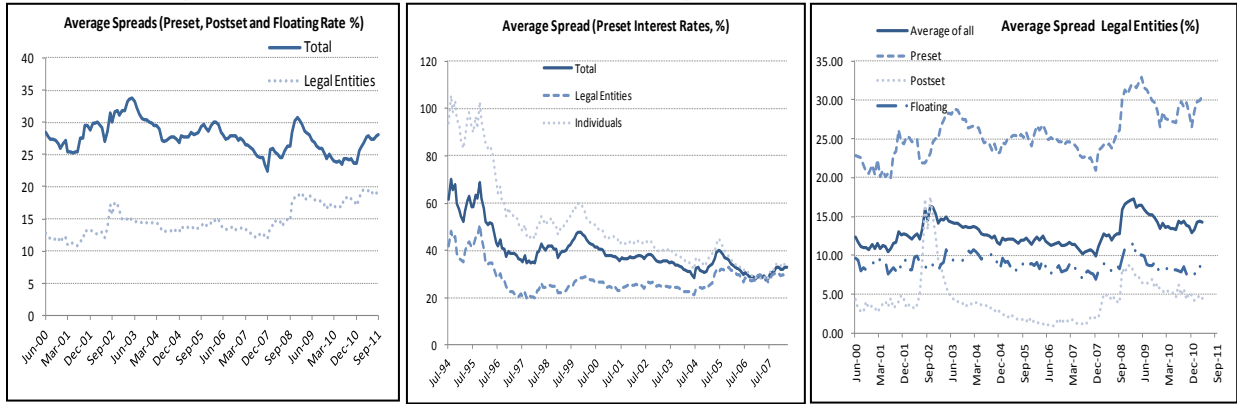
Figure 1.14: Average Lending Rates, Spreads, and the SELIC



Source: BCB and FINSTATS

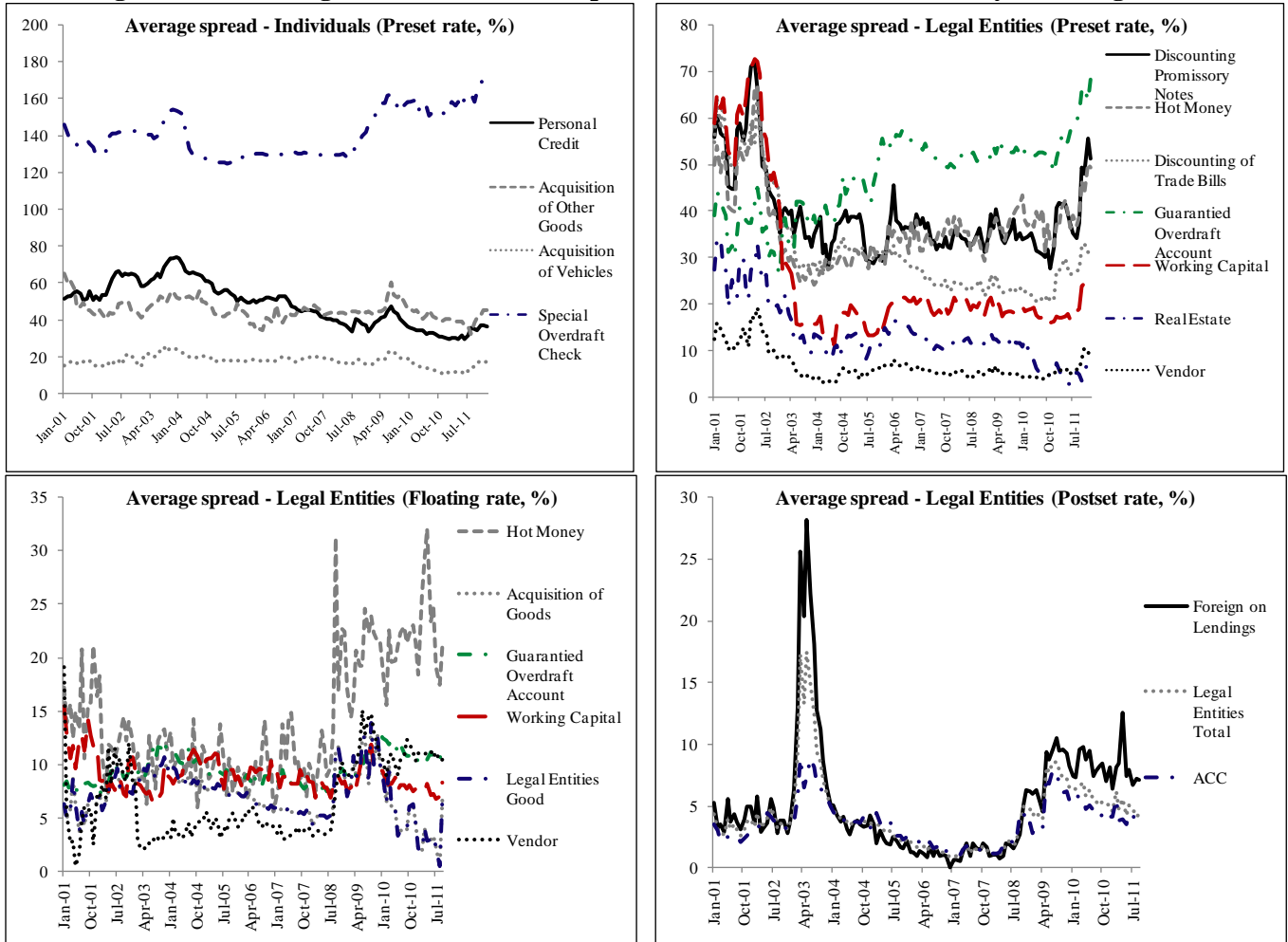
1.16 **Over the past decade, average spreads hovered around 25-30 percent, despite a more pronounced decline for individual loans.** The observed trends in spreads can be separated into two episodes. In 1998-2000, they underwent a steep drop. In 2000-2010, they have remained virtually constant, on average, yet falling much more for individuals while rising for firms. Movements in spreads differed substantially across loan categories. For individuals, the most marked decline has been registered for personal credits and the acquisition of goods other than vehicles. Vehicle acquisition saw largely stable rates, while spreads for special overdraft checks rose (see Figure 1.18). For firms, spreads can be divided by rate type and loan segments. There are three types of rates – preset, floating, and postset. All three experienced a slowly rising trend since 2000 (see Figure 1.15). For preset rates, data is available since 1994, showing a sharp decline until 2000. In 2002-2003 and 2008-2009, preset spreads rose, on average, for most loan categories (see Figure 1.16).

Figure 1.15: Average (Non-Earmarked) Spreads to Firms and Individuals



Source: BCB

Figure 1.16: Average (Non-Earmarked) Spreads to Firms and Individuals by Loan Segment



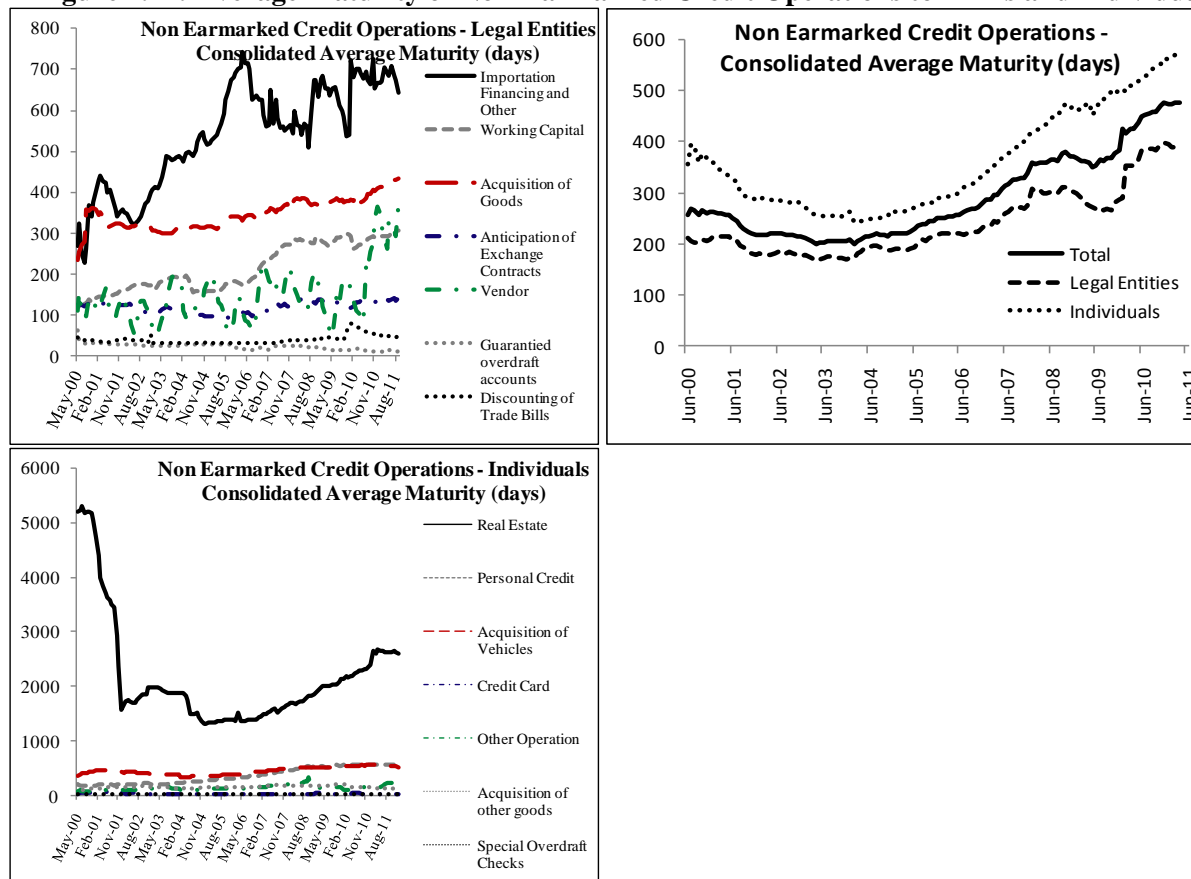
Source: BCB

Loan Terms

1.17 Although credit prices for consumer loans have fallen by half since the 1990s, households continue to face interest rates of more than 50 percent. This raises the question of how they can afford to borrow. One hypothesis is that credit rationing has left pent-up consumer demand, consumers or firms so desperate for credit that high interest rates would not deter them.⁸ But increased supply of loans has not always been accompanied by better terms on loan amounts and maturities.

1.18 The average maturity of non-earmarked credit operations has risen substantially over the past five years, both for firms and individuals. For firms, maturities have lengthened on loans for working capital, goods acquisition, import financing, and other operations (see Figure 1.17). For individuals, substantial increases in maturities have occurred in real estate and personal credit loans.⁹

Figure 1.17: Average Maturity of Non-Earmarked Credit Operations to Firms and Individuals



Source: BCB

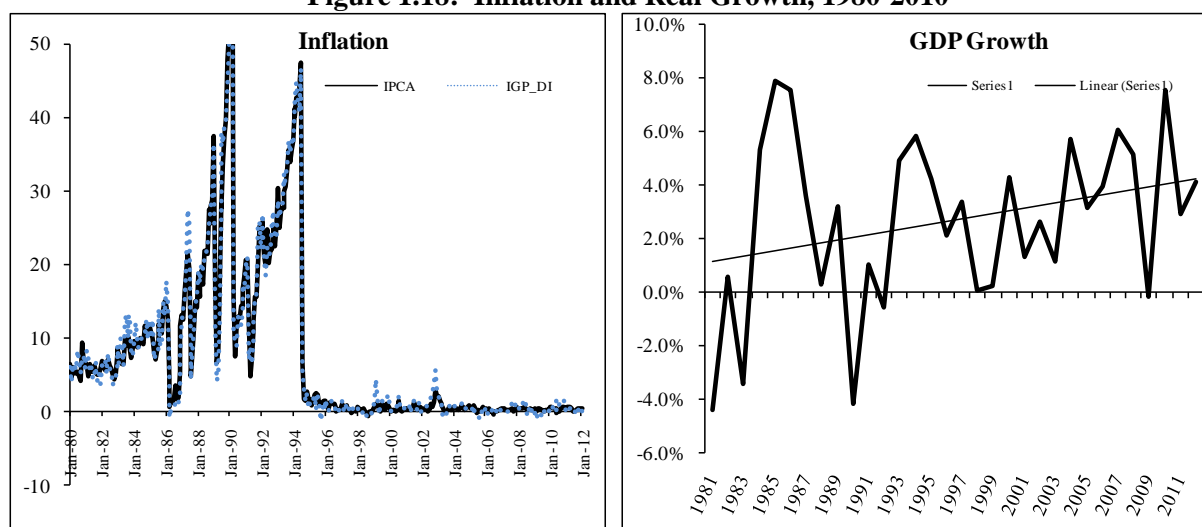
⁸ Nevertheless, high interest rates do have an effect on borrower's behavior (e.g., moral hazard linked to higher risk-taking).

⁹ Credits to individuals appear to have longer maturities compared to firms, largely driven by mortgage lending

The macroeconomic environment

1.19 **Brazil's macroeconomic environment has improved substantially since 1994.** The “lost decade” of the 1980s was characterized by macroeconomic instability—hyperinflation, stagnation, and frequent crises. Stability did not return until Brazil achieved low inflation and positive growth in second half of the 1990s (see Figure 1.18). The first phase of macroeconomic stabilization began in 1994 with the *Plano Real*, which brought inflation down from triple digits to single digits. Despite this marked improvement, several root causes of macro instability remained, namely a lack of credibility with respect to fiscal, debt, and monetary policy. Contagion from the Tequila, Asian, and Russian crises in 1995-1998 and led to the Brazilian debt and currency crisis, followed by a second phase of macro stabilization.

Figure 1.18: Inflation and Real Growth, 1980-2010



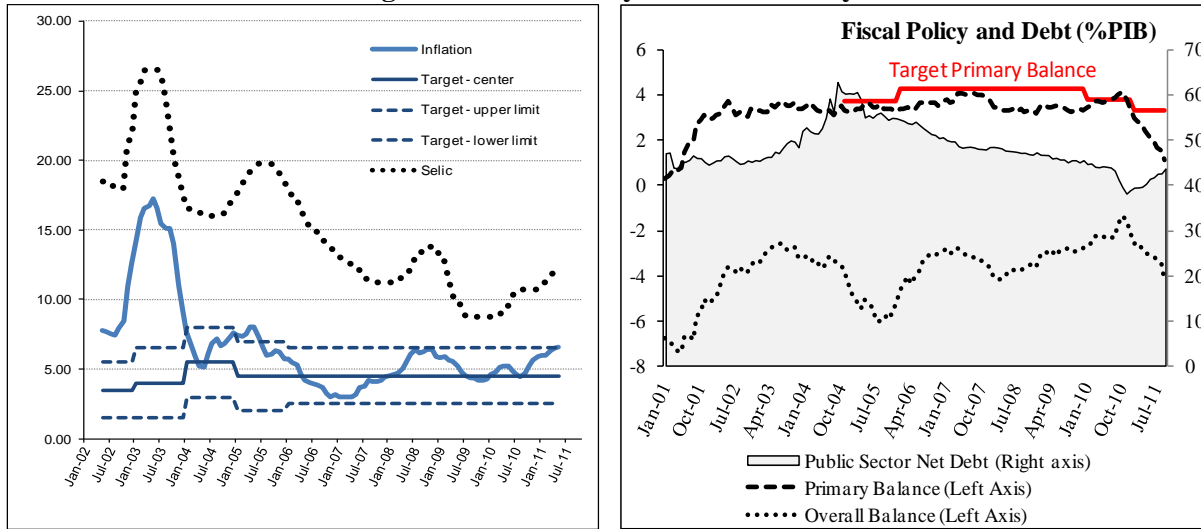
IPCA: IPCA, or Extended National Consumer Price Index, is calculated by IBGE (Instituto Brasileiro de Geografia e Estatística) and reflects the average cost of living in 11 major Brazilian cities for families with income up to 40 minimum salaries.

IGP-DI: IGP-DI monitors inflation from the 1st to the 30th of each month and is composed of wholesale prices (60% weight), consumer prices (30% weight) and construction (10% weight).

Source: WEO October 2010

1.20 **The 2000s were a decade of macroeconomic consolidation.** Brazil adopts a free-floating exchange rate and inflation-targeting system in 1999. Marked improvements were also achieved on the fiscal front, with a substantial reduction in net public sector debt, high primary surpluses, and the adoption of the Fiscal Responsibility Law in 2000. All set the stage for sound monetary and fiscal policy. The inflation target currently stands at 4.5 percent, with a 2 percentage point band, down from 8 percent in 1999 (see Figure 1.19). Similarly, the headline interest rate instrument, the SELIC, has declined from 45 percent in March 1999 to a low of 8.75 percent after the 2008 financial crisis. It has since rebounded to 12.5 percent by mid 2011 but is back to around 9 percent in 2012. Central Bank credibility has grown as a result of the prolonged period of low inflation within the target-band limits.

Figure 1.19: Monetary and Fiscal Policy



Inflation Targeting in Brazil

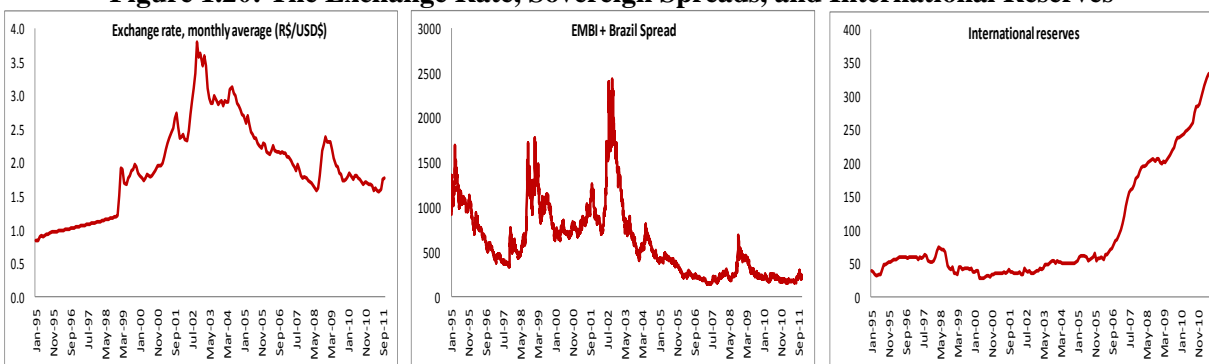
Year	Regulation	Date	Target (%)	Tolerance Intervals (p.p.)	Upper and Lower Limits (%)	Actual Inflation (IPCA, % p.a.)
1999			8	2	6-10	8.94
2000	Resolution 2,615	6/30/1999	6	2	4-8	5.97
2001			4	2	2-6	7.67
2002	Resolution 2,744	6/28/2000	3.5	2	1.5-5.5	12.53
2003 ^v	Resolution 2,842	6/28/2001	3.25	2	1.25-5.25	
	Resolution 2,972	6/27/2002	4	2.5	1.5-6.5	9.30
2004 ^v	Resolution 2,972	6/27/2002	3.75	2.5	1.25-6.25	
	Resolution 3,108	6/25/2003	5.5	2.5	3-8	7.60
2005	Resolution 3,108	6/25/2003	4.5	2.5	2-7	5.69
2006	Resolution 3,210	6/30/2004	4.5	2	2.5-6.5	3.14
2007	Resolution 3,291	6/23/2005	4.5	2	2.5-6.5	4.46
2008	Resolution 3,378	6/29/2006	4.5	2	2.5-6.5	5.90
2009	Resolution 3,463	6/26/2007	4.5	2	2.5-6.5	4.31
2010	Resolution 3,584	7/1/2008	4.5	2	2.5-6.5	
2011	Resolution 3,748	6/30/2009	4.5	2	2.5-6.5	
2012	Resolution 3,880	6/22/2010	4.5	2	2.5-6.5	

^v The Open Letter, of 12/2003, adjusted the targets to 8.5% for 2003 and 5.5% for 2004.

Source: BCB

1.21 **Brazil has enjoyed more economic stability since 2003.** Growth finally picked up nine years after the *Plano Real* due to a stabilized internal environment and a favorable external one. The Central Bank has been steadily accumulating international reserves (see Figure 1.20). Improved creditworthiness is evidenced by continued capital inflows (causing the exchange rate to appreciate), the narrowing of sovereign spreads, and improved credit ratings. Brazil's foreign debt was upgraded to investment grade—at BBB- by Standard and Poor's and Moody's and BBB by Fitch Ratings in 2008.

Figure 1.20: The Exchange Rate, Sovereign Spreads, and International Reserves



Source: BCB, JP Morgan

1.22 **Low and stabilized inflation, credible monetary and fiscal policies, and decreased output volatility tend to reduce the macro-risks associated with lending and trigger expanded credit provision, lower interest rates and spreads, and expanded access to credit.** But it was only in 2004, ten years after the Real plan and four years after the adoption of the Fiscal responsibility Framework that credit markets began to take off.

The Banking Sector

1.23 **The Brazilian banking system has undergone important transformations in terms of increased stability and increased sophistication.** Until 2002, the system exhibited a preference for liquidity, continuing the practices of the years of high inflation by relying on public bonds. Since 2003, banks have changed the composition of their portfolios, expanding credit to the private sector and aggressively increasing market penetration and profit margins. Macro stabilization combined with micro reforms to lay the foundations for this shift towards prioritizing credit expansion (as discussed in Chapters 2 and 3).

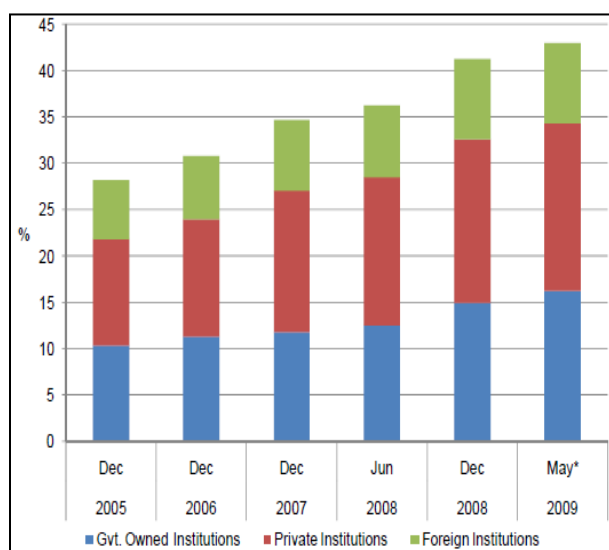
1.24 **Domestic institutions (49 percent) and domestic institutions with foreign ownership (35 percent) make up a large part of the Brazilian banking system** (see Figure 1.21). Public banks account for around 8 percent of total assets. Credit is composed of primarily domestic financing sources, funded by local-currency deposits, domestic fixed income corporate securities, and low mortgage securities exposure (less than 5 percent of GDP).¹⁰ The significant role of Brazil's public-sector banks contrasts with trends in more developed countries.¹¹

1.25 **The banking system has become more concentrated.** As part of the measures to strengthen the resilience of the financial sector during the 2008 crisis, the Central Bank encouraged market consolidation. The top five banks' share of total assets grew from 59 percent in June 2008 to nearly 75 percent in December 2008 (see Figure 1.22).

¹⁰ According to Global Property Guide.

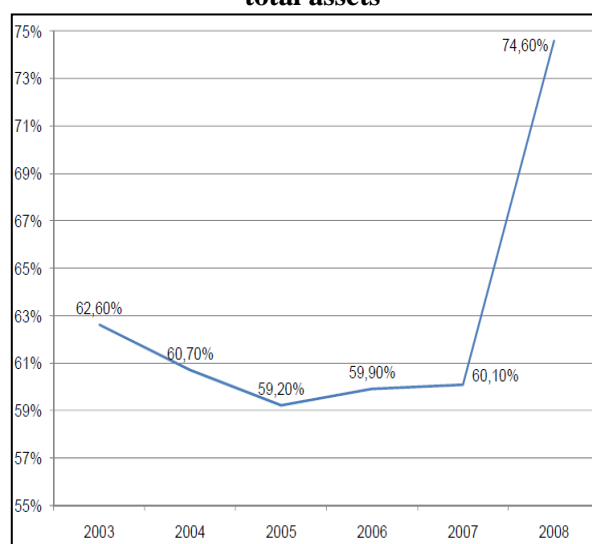
¹¹ The Soundness of the Brazilian Banking System, Tesouro Nacional, August 2009.

Figure 1. 21: Credit/GDP (by type)



Source: Banco Central do Brasil

Figure 1. 22: Assets of largest 5 banks as % of total assets



Source: Banco Central do Brasil

1.26 The Brazilian banking market is relatively profitable when compared to other countries. Despite some decline in 2008, the return on assets (Table 1.3) and return on equity (Table 1.4) in Brazil remained high by international comparison.

Table 1.3: Return on Assets (%)

	2003	2004	2005	2006	2007	2008
Argentina	-3.0	-0.5	0.9	1.9	1.5	1.6
Australia ¹	1.6	1.1	1.0	1.0	1.0	0.9
Brazil ²	1.6	1.9	2.2	2.1	2.4	1.9
Canada	0.7	0.8	0.7	1.0	0.9	1.3
Chile	1.3	1.2	1.3	1.3	1.1	1.2
China ³	0.3	0.5	0.6	0.7	1.0	...
Colombia	1.9	2.7	2.7	2.5	2.4	2.4
India ⁴	1.0	0.8	0.9	0.7	0.9	1.0
Mexico ⁵	4	1.6	1.8	2.7	3.1	2.7
Peru	1.1	1.2	2.2	2.2	2.5	2.5
Russia ⁶	2.6	2.9	3.2	3.2	3.0	1.6
South Africa	0.8	1.3	1.2	1.4	1.4	1.8
Spain	0.9	0.9	0.9	1.0	1.1	1.0
United States ⁷	1.4	1.3	1.3	1.3	0.8	0.3

1/ Gross profits until 2003

2/ Central Bank data

3/ 2007 figure is net income to end-of-period assets.

4/ For the end of the fiscal year

5/ Before tax

6/ Not annualized.

7/ All FDIC-insured institutions.

Source: Global Financial Stability Report

Table 1.4: Return on Equity (%)

	2003	2004	2005	2006	2007	2008
Argentina	-22.7	-4.2	7.0	14.3	11.0	13.5
Australia ¹	24.2	16.0	14.7	16.8	18.1	17.0
Brazil ²	21.1	22.1	29.5	27.3	28.9	20.4
Canada	14.7	16.7	14.9	20.9	16.1	28.9
Chile	16.7	16.7	17.9	18.6	16.2	18.9
China ³	...	13.7	15.1	14.8	19.9	...
Colombia	17.1	23.0	22.1	20.2	19.5	20.0
India ⁴	18.8	20.8	13.3	12.7	13.2	12.5
Mexico ^{1,5}	16.1	17.2	24.4	26.2	19.9	12.8
Peru	10.7	11.6	22.2	23.9	27.9	30.6
Russia ⁶	17.8	20.3	24.2	26.3	22.7	12.1
South Africa	11.6	16.2	15.2	18.3	18.1	17.5
Spain	13.9	14.7	16.8	19.6	19.7	16.8
United States ⁷	15.0	13.2	12.7	12.3	7.8	3.3

1/ Gross profits until 2003

2/ Before tax.

3/ Commercial banks.

4/ 2007 figure is net income to end-of-period equity.

4/ For the end of the fiscal year

5/ Before tax

6/ Not annualized.

7/ All FDIC-insured institutions.

Source: Global Financial Stability Report

1.27 The Central Bank regularly monitors internal controls, limits on client exposure, loss provisions, and credit risk capital in active operations. The regulation mandates organizational structures in each financial institution to manage credit, market, and operational risks and capital requirements for each of these risks, according to the Basel II and III principles. Some aspects of the national financial regulation system are particularly conservative but likely increased the resiliency of Brazil's banking sector to financial crises. A legacy of the pre-1994

high inflation period was financial institutions' heightened capacity to closely monitor processes to check and balance their positions within very unstable environments. The financial regulation in Brazil is infra-legal (i.e., National Monetary Council resolutions and Central Bank norms), which allows regulation to reflect financial innovations, international standards, and changes in competition. In contrast to other countries, there are no important players outside Central Bank supervision; the regulation applies to every financial institution.

1.28 Significant financial sector deepening has occurred since the late 1990s across a range of indicators (see Figure 1.23). Brazil ranks highly among emerging markets in domestic bank deposits as a share of GDP, but the private bank credit/GDP ratio is low and the securitization market is small in comparison to the country's credit volume (less than 10 percent). Despite recent positive developments, Brazil has a long way to go in terms of financial innovation and capital-market diversity and depth.

1.29 Banking sector competition has been declining over the last decade. Bank asset concentration, defined by Bankscope as the three largest banks' share of commercial bank assets, has been rising. The private segment of the banking system consists of five large financial conglomerates and more than 120 smaller institutions that operate in specific market segments.

1.30 Historically, public banks and directed credit have accounted for a large share of credit provision in Brazil, with the objective of guaranteeing supply of credit at low cost. The three largest public banks are the Brazilian National Development Bank (BNDES), the *Caixa Economica Federal* (CEF or *Caixa*), and Banco do Brasil (BB). They were created to provide liquidity that was otherwise lacking—i.e., provide a financing source in the absence of functioning private financial markets (see Box 1.2). In 1964, financial reforms included establishment of the monetary correction institution, the creation of Brazil's Central Bank, and the removal of the *Lei da Usura*.¹² Until the early 1970s, these policies contributed to a credit expansion led by public banks. The 1973 oil price hike initiated an extended period of hyperinflation in which public banks and directed credit were the main sources of financing for Brazil's economic activities. Without them, growth would have been even slower. Not even inflation indexation guaranteed purchasing power, and public banks accumulated large losses in their credit portfolios. By the end of the hyperinflation period in 1994, the public sector provided 57 percent of total credit.

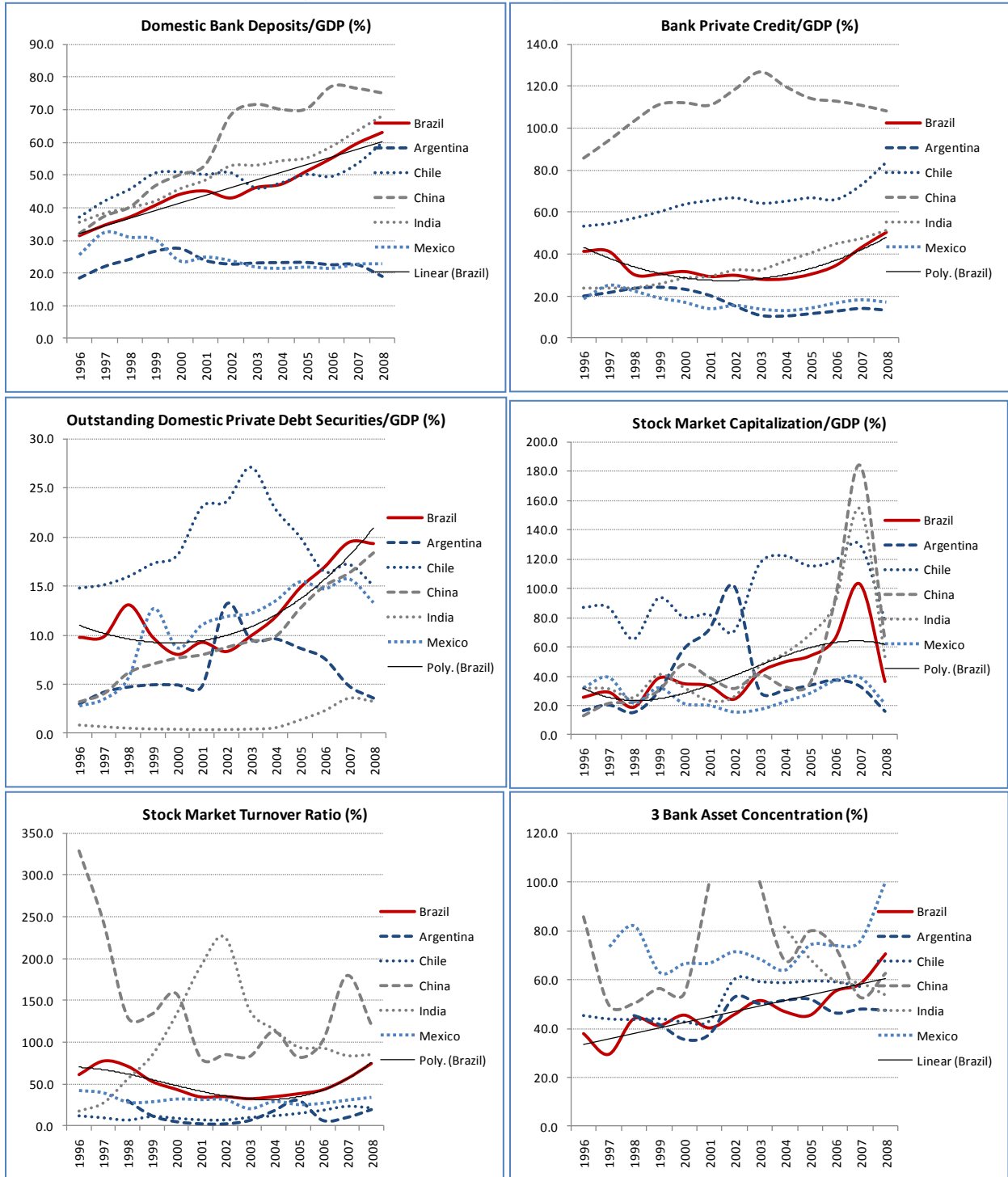
¹² From 1929 until 1964, a law ("*Lei da Usura*") limited interest rates at 12% per year. Combined with high macroeconomic instability, this reduced incentives for private credit provision, which was scarce, short-term, and expensive.

Box 1. 1: The Rationale for Public Banks

Public banks aim to address current market failures, provide credit to market segments not well-served by private banks, and expand the range of credit services available to firms and individuals. There are three dominant public banks in Brazil. Originally created to provide long-term corporate credit, **BNDES** has extended its lending to include small and medium enterprises (SMEs) and local governments. BNDES' main financing comes from federal sources, including pension and social security funds, development funds, and export promotion funds. Established in 1852, **Caixa Economica Federal** was the first public financing institution focused on savings from low-income households. This institution is currently one of the main mortgage providers in the country (housing credit is largely supplied through the Housing Financial System, or *Sistema Financeiro da Habitacao – SFH*). Caixa's loans are financed through savings and through the management of social security funds and the national lottery. **Banco do Brasil** is a commercial bank with mixed ownership, a majority share held by the Brazilian government. It operates like a large private bank but plays a special role in distributing earmarked credit resources to housing and agriculture activities (e.g., through the National System for Rural Credit, or *Sistema Nacional de Credito Rural – SNCR*).

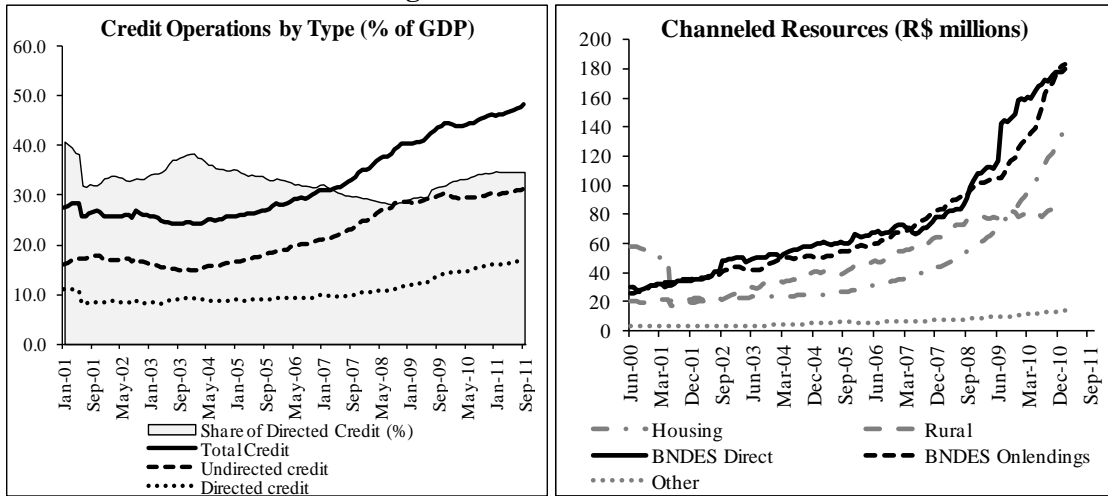
Public banks tend to serve longer-term credit market segments, such as productive firm investments and financing for the housing and rural sectors. Directed or 'earmarked' credit is mainly financed with public resources typically set in the government's budget. These resources can be increased if necessary; for example, direct lending was expanded during the last financial crisis. Lending rates for earmarked credit also follow predetermined criteria and are much less sensitive to changes in credit-market conditions. BNDES, Caixa, BB, and other public institutions are the primary sources of directed credit. But it can also be distributed by private banks, mainly through public transfers and mandatory allocation of credit to housing and agriculture. Similarly, non-earmarked credit closely follows what is usually defined as private credit, although it can originate from private as well as public banks. Financing resources originate from deposits and bonds, and lending rates fluctuate according to market dynamics. Often called "quasi-fiscal policy," much of the directed credit is provided at subsidized rates, generating fiscal costs with effects similar to that of expansionary fiscal policy.

Figure 1.23: Financial Deepening, 1996-2008



Source: Finstats

Figure 1.24: Directed Credit



Source: BCB

1.31 **Since the beginning of the macro-stabilization period, the role of public banks has been declining.** Once stabilization was achieved in 1994, public banks' accumulated losses and damaged balance sheets needed to be addressed. Government intervention programs (PROER, PROES, and PROEF), debt federalization, and privatization of many insolvent public banks followed. Total credit availability contracted from 37 percent of GDP in 1994 to 24 percent in 2004. During this period, public credit growth lagged private credit growth, which predominantly came from foreign credit in the 1990s before domestic private credit began to gain momentum in the 2000s.

1.32 **As the macro environment stabilized and private credit markets developed in 2004-2008, undirected credit picked up while directed credit remained stable as a share of GDP.** Since the 2008 financial crisis, directed credit has risen to a third of total credit, once again gaining share over undirected credit (see Figure 1.24). Directed credit with subsidized interest rates is issued to many companies and across many sectors. The resulting distortions crowd out private investment in some cases and render available price information less useful. In 2011, BNDES is set to receive R\$58.3 billion in loans from the Treasury, aimed at ensuring close to R\$150 billion in new investments. During 2009-2010, BNDES received R\$210 billion from the Treasury at subsidized rates, with repayment over 20 years.

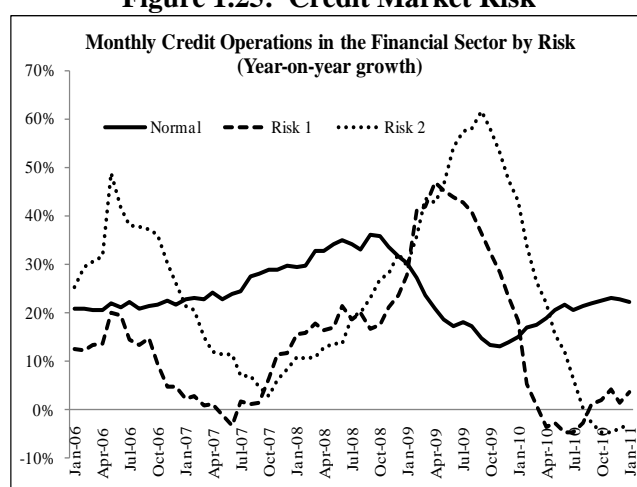
1.33 **Access to BNDES' subsidized credit is uneven.** Charging below-market interest rates at long-term maturities, BNDES provides extremely attractive financing terms. Between 2009 and March 2012, the average total cost to the final borrower of a BNDES loan with resources from the Treasury was 7.53 percent a year, compared to the average remuneration of BNDES of 1.72 percent (includes basic pay rate, credit risk, and financial intermediation). The cost is somewhat lower for large firms (7.70 percent a year) and somewhat higher for medium (7.79 percent) and small companies (7.74 percent). These attractive rates have created high demand for BNDES financing, yet the process for firm selection is not public. Credit outcomes, on the other hand, point to skewed access to inexpensive resources. For the most part, BNDES financing has been

provided to large corporate groups (over 64 percent), rather than SMEs.¹³ Petrobras, Eletrobras, and 10 private groups received 57 percent of BNDES' funds between 2008 and June 2010.¹⁴ Multinationals have increasingly become recipients of BNDES credit; loans to firms with foreign capital doubled from R\$9.8 billion (US\$5.8 billion) in 2007 to R\$20.4 billion in 2009.

Sustainability

1.34 **The exceptional pace at which credit has been expanding since 2010 has sparked concerns over its sustainability.** The international financial crisis and resulting credit rationing led to a portfolio shift toward higher-risk loans. As the economy returned to normal after the financial crisis, lower risk-taking by the financial sector saw fewer operations in riskier categories 1 and 2 (see Figure 1.25).

Figure 1.25: Credit Market Risk



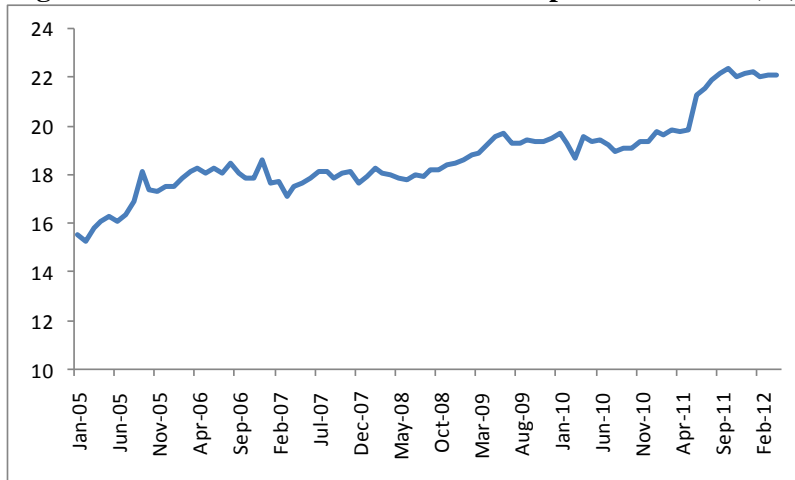
Source: Central Bank of Brazil

1.35 **Personal indebtedness has reached high levels, with household debt as a share of total income rising from 18 percent in the beginning of 2005 to 43 percent in the first quarter of 2012.** Debt repayments currently account for 22 percent of the average family's disposable income, well above the world average and a historical record for the series which began in 2005. Debt service burden is also considerably higher when compared to 2010, when it averaged slightly above 19 percent during a period of strong stimulus for credit expansion. On a positive note, the ratio has fluctuated around 22 percent since June 2011 when it suffered a sudden jump of almost 1.5 percentage points. This could indicate a change in consumer behavior towards new debt acquisition. Consumers started giving preference to repaying old debt in order to restore purchasing power.

¹³ Valor Econômico, August 12, 2010.

¹⁴ Folha de S. Paulo, August 9, 2010.

Figure 1.26: Household Debt Service to Disposable Income (%)



Source: WB calculations

1.36 Credit expansion pressured delinquency rates from 2011 to early 2012. Default rates (defined as those with balances overdue for 90 or more days) rose to 5.9 percent in April 2012, compared to 4.5 percent in the end of 2010. While individuals default rate rose 2.1 percentage points in the period, reaching 7.8 percent, non-performing corporate credit reported a stronger resilience, increasing from 3.5 percent to 4.1 percent in April 2012. Early stage loan delinquencies indicators have broadly stabilized after a prolonged cycle of deterioration, indicating a better scenario for loan quality deterioration. As of April 2012, the system's NPLs stood at 3.8 percent, just a tad above the previous month (3.3 percent in April 2011). In large part, credit quality negative pressures stem from the consumer lending portfolio, reflecting the aggressive credit penetration strategies of most banks in the system vis-à-vis this sector. Given its short term nature, commercial loan portfolio can be easily re-priced at maturity with the new lower rates easing pressure on borrowers, and thus keeping delinquencies at stable levels.

1.37 Concluding Remarks. This chapter's descriptions of trends in aggregate credit, the roles of public and private banks in supplying credit, and household and firms' access to credit point to two questions. Banking spreads in Brazil still rank among the world's highest. Why have they remained high when the reference rate (SELIC) and the cost of funds declined? The recent credit expansion benefited consumers, who borrowed more on improved terms due to new credit instruments like payroll loans. But firms did not receive a comparable dividend. What factors explain these differences? The analysis in the remainder of the report seeks to answer these two questions.

CHAPTER 2. MACRO: THE TRANSMISSION OF MONETARY POLICY TO CREDIT

This chapter looks at the effectiveness of monetary policy in shaping credit outcomes during the first decade of the 21st Century. The discussion focuses on three transmission mechanisms—the broad interest rate channel, the credit channel, and the reserve requirements channel. The assessment of the broad interest rate channel indicates full pass-through to long-term lending rates at the loan level. In the short run, impacts are greater on shorter maturity loans than on longer term loans. We find that the supply of loans is fairly elastic. The elasticity of loan demand varies by type of transaction; demand is more inelastic for consumer credit than for working capital loans. Finally, banks' supply of credit responded to changes in reserve requirements during the recent global financial crisis. Overall, monetary policy has become more effective during the past decade in influencing economic activity.

2.1 Since January 2000, the stated objective of Brazil's Central Bank has been to enforce the inflation-targeting regime. The inflation target has varied over time from an initial 8 percent in 1999 to a record low 3.25 percent in 2003; it rose to 5.5 percent in 2004 and fell again to its present level of 4.5 percent. The band width has varied from 2 to 2.5 percentage points. The Central Bank conducts monetary policy through: (i) open market operations to adjust overnight liquidity and maintain the targeted interbank rate (SELIC) set by the monetary policy committee; and (ii) changes in reserve requirements. Open market operations have been the most frequently used monetary policy tool throughout the decade. The reserves lever was little used until the 2008 financial crisis, when the reserve requirement was reduced as part of the country's countercyclical strategy. Since January 2010, the Central Bank has considerably increased reserve requirements and taken other prudential measures to slow the rapid credit growth taking place in some market segments. The Central Bank also intervenes in exchange rate markets, buying and selling currency to regulate international reserves and ensure proper functioning of capital markets. Acquiring foreign reserves increases liquidity in the economy, which the Central Bank seeks to neutralize through open market operations.

2.2 The macro influence of monetary policy on economic activity operates through the broad interest rate channel and changes in reserve requirements, whereas the credit channel functions on the micro level. Research indicates that the broad interest rate channel is the main vehicle of monetary policy transmission. Changes in the money supply affect short-term interest rates, which in turn impact the relative prices of assets and investment, thus affecting wealth and consumption. Money supply actions also affect long-term interest rates and exchange rates, leading to changes in capital inflows and adjustments in GDP and the external balance.¹⁵ Multi-country analyses usually find economic activity responds sluggishly to changes in bank interest rates in the short run, but there is no consensus on a perfect pass-through in the long run.¹⁶

¹⁵ Taylor (1995).

¹⁶ Hannan and Berger (1991) studied the case of deposit interest rates, and Kourelis and Cottarelli (1994) examined loan interest rates in an international context. Sander and Kleimeier (2002) and De Bondt (2002) use European data to analyze the asymmetric adjustment of retail bank interest rates to monetary impulses; Kleimeier and Sander (2006) investigated the pass-through by differentiating between expected and unexpected monetary policy shocks; and De Graeve et al. (2007) and Gambacorta (2008) tested the existence of bank heterogeneity in the pass-through.

2.3 Reserve requirements directly affect banks' ability to lend by requiring them to hold minimum unremunerated (or under-remunerated) reserves against their liabilities. Changes in reserve requirements, therefore, have a direct and rapid effect on the availability of credit and bank lending rates. Proponents contend that higher reserve requirements can be used to increase financial sector stability. In addition, reserve requirements can be a countercyclical monetary policy tool.

2.4 The credit channel breaks down into two components—the bank lending effect and firms' balance sheet effect. In the bank lending effect, changes in the monetary policy rate affect banks' cost of funds and alter the marginal cost of providing loans. An increase in the base rate, for example, leads to a reduction in funds available for lending and prompts banks to raise their rates, with the size of the impact dependent on the structure of bank funding. In the firms' balance sheet effect, changes in the monetary policy rate affect firms' net worth and their ability to provide collateral, which has ripple effects on their creditworthiness and ability to qualify for loans. This chapter addresses each of the two channels as well as the reserve requirements channel in turn.

Channel I: The Broad Interest Rate

2.5 The broad bank lending channel was not effective in Brazil during the first part of the decade (2000-2004). Movements in the SELIC did not seem to influence bank lending decisions or the supply of credit. Increasing interest rates only served to lower banks' use of deposits as a source of finance because depositors preferred to invest in relatively safe government bonds. Graminho and Bonomo (2002) argue that Brazil's tightening of monetary policy through higher interest rates did not translate into less lending in the beginning of the decade; instead, it lowered the sensitivity of bank lending to the liquidity of its assets. Chu and Nakane (2001) investigate the transmission channels of monetary policy in Brazil, finding that SELIC changes had positive effects on output but ambiguous effects on bank spreads.

2.6 As the economy stabilized over the decade, the impact of monetary policy interventions on economic activity gained ground. The change is due to the declining relative importance of the factors that blunt monetary policy tools and changes in the determinants of bank and firm behavior. Some structural shifts have been particularly important. On the macro side, they include decreases in the SELIC rate, the levels and expected volatility of inflation, and the debt-to-GDP ratio; at the same time, dollar-denominated reserves and fiscal surpluses increased. These have resulted in changes in the government debt composition and the inversion and lengthening of the yield curve over time (see Chapter 1). As the economy stabilized, bank behavior changed due to positive developments in the regulatory environment, funding structure, and risk perception (discussed in Chapter 3). And a growing economy strengthened firms' balance sheets, fueling demand for credit.

2.7 The rapid credit expansion between 2004 and the 2008 crisis (see Figures 1.2 and 1.24) was largely driven by undirected credit from private banks—and that has implications for the effectiveness of monetary policy. Changes in the short-term policy rate do not affect loans provided by public banks at subsidized rates or the directed loans to specific instruments or sectors. The smaller the share of public bank and directed credit, the more

effective monetary policy is in affecting firms' investment decisions.¹⁷ During the last quarter of 2008 and most of 2009, the government implemented an aggressive expansion in credit from public banks to support credit supply. As a result, credit from public banks has increased and almost outpaced credit from domestic private banks. Now that the crisis is over, however, the reversal of public bank lending has been slow.

2.8 In sum, the stabilization of the economy over the past decade has brought structural changes that have enhanced monetary policy effectiveness in Brazil. During the second part of the decade, market interest rates became more sensitive to policy rates—in fact, the household interest rate channel played the most important role in explaining output dynamics.¹⁸

2.9 Many of the factors that prevented monetary policy from being effective have improved. These include the term structure of interest rates and overreliance on SELIC-indexed government debt instruments. However, new challenges have emerged in the post-crisis environment, such as a capital-inflow surge that has added liquidity to the economy. The Central Bank needs to mop up the excess liquidity. The appropriate mix between the interest rate instrument and/or macro prudential measures is especially pertinent during episodes where inflation surges above the target band and credit continues to grow in some segments. As Brazil seeks to limit credit growth in some loan categories through higher reserve requirements, it is interesting to see whether the overall increased effectiveness of monetary policy at the aggregate levels holds to some extent at disaggregated levels (see below). Finally, growth in public bank lending relative to private bank credit raises some concerns about monetary policy effectiveness.

2.10 The interest-rate channel of monetary policy transmission is assessed empirically based on a disaggregated model for the five loan products.¹⁹ Disaggregation isolates effects within each loan category that may have been otherwise undetectable. The completeness hypothesis is used to test the efficiency of the transmission of monetary policy; i.e., whether there is a one-for-one pass through from the policy rate to bank rates. The categories are the most representative for corporate and consumer (or retail) loans: vendor, working capital, personal, purchase of vehicles, and purchase of other goods.

2.11 The paper also investigates bank-specific factors that drive heterogeneity in pricing policies. We focus on two particular pricing measures—the interest spread and a consolidated measure of interest rate per bank. We consider the effects on deposit and loan interest rates of characteristics such as bank liquidity, bank capitalization, bank efficiency, size, and stock of non-performing loans. Liquidity matters for banks because it acts as a buffer against market fluctuations. Capital matters because financial institutions must retain regulatory capital against risk-weighted assets, implying that capital adequacy influences their lending.

2.12 The regression results indicate that banks fully adjust lending rates to a change in the monetary policy rate (SELIC) in the long run, but the short-term elasticities vary by

¹⁷ Minella and Souza-Soubrinho (2009) find evidence that the large share of public bank and directed lending accounts for about a third of the actual spread.

¹⁸ Minella and Souza-Soubrinho (2009) find evidence of increased transmission of monetary policy to the economy, identifying channels centered on household and firms' interest rates, exchange rates, and inflation expectations.

¹⁹ This section is based on the background paper: "Revisiting Bank Pricing Policies in Brazil: Evidence from Loan and Deposit Markets" Leonardo S. Alencar (Central Bank of Brazil)

loan category. Estimates for the long-term pass-through indicate a one-to-one transmission of monetary policy for all five loans categories. In the short term, vendor loans have the highest responsiveness, while adjustments for working capital, personal loans, and purchasing goods other than vehicles are sticky. The difference in the pass-through may reflect average maturity; since the SELIC is short-term, it would tend to have a greater impact on loan categories with shorter average maturities. This is borne out in the sample—the average maturity of vendor loans is 72 days, while it exceeds 175 days for other loan categories.

2.13 The analysis also provides evidence that banks fully adjust short-term lending rates to changes in the base rate, but this is not the case for time-deposits, which display interest rate stickiness, even in the long run.²⁰ This stickiness may be related to a lack of competition in the bank-funding market. The pass-through is complete in the long run for corporate loans, but the same cannot be concluded for retail loans. The monetary policy rate has an immediate impact on the interest spreads, but the effect seems to vanish in the long run.

Table 2. 1: Interest Rate Transmission by loan product categories

Dependent variable: Loan interest rate	Corporate loans			Retail loans	
	Vendor	Working Capital	Personal loans	Purchase of vehicles	Purchase of other goods
Immediate pass-through	1.110*** (0.217)	0.683*** (0.108)	0.385*** (0.093)	0.689*** (0.190)	0.549*** (0.135)
Long run pass-through	1.202*** (0.180)	1.029*** (0.104)	2.484** (1.201)	1.441*** (0.217)	1.424** (0.550)
Tests					
Wald test for unitary immediate pass-through	0.26 [0.619]	8.52*** [0.006]	42.88*** [0.000]	2.66 [0.115]	11.09*** [0.003]
Wald test for unitary long run pass-through	1.26 [0.278]	0.08 [0.778]	1.53 [0.224]	4.12* [0.053]	0.59 [0.450]
Serial correlation problems in the errors	No	No	No	No	No
Hansen test	2.79	21.85	20.82	4.76	0.57
No. of banks / observations	15 / 1,121	32 / 2,504	35 / 2,673	24 / 1,307	20 / 1,408

Note: The complete estimation results are presented in the Appendix. Heteroskedasticity-robust standard errors are in parentheses, and the brackets contain p-values. ***, **, * indicate significance at the 1, 5 and 10% levels, respectively.

2.14 We find the volatility of monetary policy is positively correlated with lending rates and negatively correlated with time-deposit rates. To maximize expected utility or wealth, banks are risk averse to fluctuations in interest rates. Since most credit from non-earmarked bank funds is contracted at a pre-fixed rate in Brazil, this risk may be relevant. Ho and Saunders (1981) and Maudos and Guevara (2004) also indicate a positive correlation between interest rate volatility and the spread.

²⁰ This result is consistent with Gambacorta (2008), who finds that the long-run effect of changes in Italy's policy rate was less than one for time deposits but complete for loans. Berstein and Fuentes (2004) find a higher pass-through for loans in Chile.

2.15 Further regression analysis shows that income growth is associated with higher loan rates and spreads in Brazil. Better economic conditions increase the expected net value of investment projects, increasing loan demand and banks' need for funds, implying that interest rates on loans and time deposits depend positively on the level of economic activity.²¹ On the other hand, increases in national income boost banks' funding sources, which would diminish deposit interest rates and loan rates.

2.16 There is no evidence that banks' capitalization affects loan pricing. However, liquid banks have lower interest rates on corporate loans, and they also have lower spreads. Kashyap and Stein (2000) and Kishan and Opiela (2000) find evidence that small banks with low liquidity levels and low capitalization charge higher rates for loans and are more vulnerable to monetary shocks. Indeed, small and low capitalized banks pay higher premiums on their funding because the market considers them riskier. Furthermore, these banks are more likely to be affected by asymmetric information regarding client assets, and they are more likely to lose clients after a monetary shock. Finally, banks' capacity to expand lending is directly linked to their capitalization because of regulatory requirements to maintain certain levels of capital relative to asset risk. This is relevant for two reasons—reserve requirements are higher in Brazil than in other countries, and Brazil has placed increasing importance on reserves as a macro prudential tool. If a change in reserve requirements affects liquidity (see Gray 2011), it will also affect corporate rates and the spread, with the greatest impact on small and less capitalized banks.

2.17 The analysis shows that market concentration has a significant and robust positive effect on loan rates and interest spreads. This result supports the hypothesis that banks with large market share are associated with higher loan rates and interest spreads.²² This would support the view that a more concentrated banking sector would tend to operate in an oligopolistic manner, charging higher interest rates. An alternative view would be that higher concentration could reflect the fact that the most efficient banks have increased market share, leading to lower loan rates. Chapter 1 noted that Brazil's banking system is highly concentrated—around 10 percent of banks made nearly all loans in 2008.²³ Moreover, concentration increased after the financial crisis due to countercyclical measures supporting banking consolidation.

2.18 The analysis also indicates that more efficient banks have lower corporate loan rates and higher time-deposit rates. Operational inefficiency and default rates on credit portfolios represent costs to the banks, and these factors influence banks' pricing decisions. We also find that higher delinquency ratios are associated with higher loan rates and interest spreads.

2.19 Finally, corporate rates are much more sensitive than retail rates to bank-related variables, yet there is a greater impact of monetary policy on retail rates. Over the decade, the reduction of loan rates has been much more pronounced for consumers than for firms.²⁴ The volume of retail loans has also sharply increased, driven by payroll-backed loans (see Figure 1.18). Greater competition may be driving the relative importance of bank-related variables for

²¹ Melitz and Pardue (1973) present a theoretical argument that increases in income are associated with higher loan rates.

²² Berger (1995).

²³ Chang et al. (2008).

²⁴ Chapters 4 and 5 will investigate this question.

interest rates of corporates. And corporate business lines may have more alternative credit providers and fewer barriers to entry.²⁵

Channel II: Credit

2.20 The credit channel operating through firms' balance sheets was practically non-existent when inflation was high before 1994 because long-term debt was non-existent (see Box 2.1 for a description of the credit channel). In fact, borrowers' net worth increased with rises in interest rates during that period because the duration of assets exceeded the duration of liabilities (Lopez 1997). As the economy stabilized, the credit channel gradually came back into play during 2000-2004 (Kfoury and Alves 2003; Bogdanski et al. 2001). Rabanal and Schwartz (2000) find evidence of monetary-policy transmission from SELIC adjustments and lending spreads to economic activity. Credit reacts to monetary policy shocks relatively quickly, peaking after four to six months due to the short maturity of contracts in Brazil. Banks react to rising uncertainty in the money market by increasing their holdings of liquid assets (i.e., government bonds), and declining credit supply and increasing spreads affect GDP. The impact of monetary policy on the real economy through the credit channel is asymmetric; it has its greatest impact on sectors that are more working capital intensive and rely more on short-term financing (Soubrinho-Souza 2004).

2.21 The strength of the credit channel for transmitting monetary policy depends on the relative elasticities of credit supply and demand. On the supply side, financial structure shapes banks' adjustment of lending rates to changes in the money market. As seen in the previous section, the structure and terms in the money market have greatly changed over the past decade, affecting the transmission of monetary policy. The effect of money-market rates on lending rates depends largely on banks' profit-maximizing behavior. It is hard to "aggregate" this factor because the behavior of large government-owned banks lending at subsidized rates differs substantially from the behavior of private banks.

2.22 Nevertheless, the elasticity of loan demand affects adjustment costs and other factors, and the structure of adjustment costs explains banks' overall reaction. In the presence of adjustment costs, for example, a bank may decide not to modify its lending rate if it perceives that changes in the money market are only temporary. In other words, banks' assessment of the credibility of the Central Bank's stance affects their behavior. Financial structure also influences demand elasticity for loans and the timing of the banks' reaction. On the demand side, Cotarelli and Kourellis (1994) argue that each bank's loan demand will be less elastic in markets with fewer competitors, higher barriers to entry, or fewer alternative sources of finance (e.g., other financial intermediaries, foreign capital markets, commercial paper or bankers' acceptance markets for large firms; friends and family, retained earnings, trade credit group credit for smaller firms). The "hold up" problem, however, where costs associated with changing banks are high and firms and consumers are "held prisoners" of their financial institutions, may increase market segmentation. The higher the switching costs, the lower the effects of money market rates on lending rates. The costs of switching banks can be increased by the presence of barriers to entry.

²⁵ World Bank (2007).

Box 2.1: Credit Channel: How Does It Work?

Bernanke and Blinder (1988) find that the credit channel affects not only the general level of interest rates but also the external finance premium—the difference in costs between funds raised externally by issuing equity or debt and funds generated internally by retained earnings. The credit channel makes monetary policy more expansionary than in the conventional IS/LM model, increasing the transactions demand for money. In Bernanke and Gertler (1995), the existence of a credit channel that amplifies monetary policy explains why short-term policy rate increases (including overnight rates) can affect long-term decisions on investment and economic activity that should depend on long-term rates. The credit channel becomes an enhancement mechanism through which imperfect information (requiring costly contract enforcement) and other credit market frictions might affect monetary policy's potency. This happens through endogenous changes in the external finance premium, the size of which reflects credit market imperfections. In the credit view, a change in monetary policy that raises or lowers open market interest rates tends to change the external finance premium in the same direction, which magnifies the impact of monetary policy on the cost of borrowing and on real activity. Central banks' actions affect the external finance premium through the balance sheet channel and the bank lending channel.

The balance sheet effect is well established, but the bank lending channel is harder to establish because banks are likely to rely on many sources of finance beyond retail deposits, such as certificates of deposits or new equity issues. However, the existence of a bank lending channel does not require banks to be totally incapable of replacing lost deposits. It is sufficient that banks do not face a perfectly elastic demand for their open market liabilities, so that monetary policy increases the relative cost of funding of banks. Indeed, monetary policy may affect the external finance premium by shifting the supply of credit, particularly loans by commercial banks. In that case, bank-dependent borrowers may not be shut off from credit but will incur costs associated with finding a new lender, establishing a credit relationship, and so on. The global financial crisis showed that the balance sheet effects for firms are also relevant for banks. The external finance premium reflects lenders' expected costs of evaluation, monitoring, and collection; the premium that results from the fact that borrowers have more information about their prospects than lenders; and the costs of distortions in the borrowers' behavior that stems from moral hazard or from restrictions intended to contain moral hazard (such as restrictive covenants or collateral requirements).

In the balance sheet channel, a tight monetary policy directly weakens borrowers' balance sheets by increasing interest expenses, reducing cash flows, and weakening borrowers' financial positions. In addition, rising interest rates are directly associated with declining asset prices, which shrink the value of borrowers' collateral. Indirect effects arise through the increase in the financing gap—the difference between the firm's uses and sources of funds. At the same time, short-term borrowing rises following a monetary tightening in large part to finance inventory buildup, further increasing interest expenses. The effect of a corporate cash squeeze on economic behavior depends on a firm's ability to smooth the drop in cash flow by borrowing. Small firms with poor access to credit markets may have to respond by cutting employment and production, whereas larger companies with better access to credit will face less pressure (Gertler and Gilchrist 1993, 1994; Oliner and Rudebusch 1994). These effects are exacerbated during recessions. During booms, both small and large firms can smooth out effects in similar ways. As for credit to consumer durables, cars, and housing, the phasing out of interest rates ceilings in the U.S. and innovations such as liquid secondary markets for mortgages have reduced the impact of monetary policy on housing. However, the balance sheet effects for households have remained important, a fact made apparent in the recent subprime mortgage crisis.

2.23 As Brazil's macro stabilization and micro reforms gained ground over the decade, the effects of the determinants of supply and demand have changed along with the factors that blunt the reactions of banks' credit supply and firms' credit demand to changes in monetary policy.

2.24 Rationing can explain the subdued effect of expansionary monetary policy in reducing interest rates charged to households and firms. Indeed, expansionary policies can decrease rationing. More projects are financed, and banks continue to maximize profits without decreasing interest rates. Credit markets—particularly in developing countries—are characterized by asymmetric information in banking relationships. This leads to the credit rationing described in Stiglitz and Weiss (1981), where banks prefer not to raise interest rates

even though borrowers are willing to pay more. The banks exercise restraint to avoid undermining the return on projects through adverse selection (attracting riskier borrowers as less risky ones decide not to pay the higher interest rates) and/or moral hazard (borrowers choosing riskier projects to justify the higher interest rate). Those rationing effects continue to prevail as long as loan repayments are high because higher interest rates increase both default and monitoring costs.

2.25 Lock-in effects—as described in Sharpe (1990)—are another consequence of asymmetric information. There have been many reforms and new instruments over the decade to reduce asymmetric information in Brazil and reduce lock-in effects, including payroll loans (*credito consignado*) and the Central Bank credit registry SCR (2004). In Chapter 5, we present evidence of declining rationing in Brazil. Yet, it continues to some extent, and the high interest rates charged to firms tend to sustain rationing and affect the credit market’s responsiveness to monetary policy.

2.26 In sum, the empirical relevance of the credit channel depends on supply and demand elasticities, but identification issues make it difficult to distinguish between demand and supply shocks and to separate the bank lending and balance sheet channels in the data. In the following section, these challenges are addressed.

2.27 The analysis uses an identification strategy for supply and demand that is well-suited to a newly available high-frequency data set on Brazilian loans from June 2000 through December 2008.²⁶ The main data source is a call-report database from the Central Bank that contains daily information on banks and types of loan. It also includes two dependent variables: interest rates and the volume of new loans. The data set contains only non-earmarked credit. Loans are classified into six categories of lending to consumers and 11 types of credit to firms. Categories differ along several dimensions, such as the presence of collateral, type of borrower, maturity length, and whether rates are preset or adjustable.

2.28 Through heteroskedasticity,²⁷ the methodology uses the volatility of monetary policy along the supply curve to identify movements in the demand curve. Similarly, demand volatility can identify the demand curve. In the limit, demand is identified if the unobservable structural component of demand has zero variance but the error on supply varies. The exclusion restriction is satisfied if volatility in monetary policy affects the demand to a lesser degree than it affects supply (see Box 2.2 for a methodology description).

²⁶This section is based on the background paper: “Identifying Credit Supply and Demand in Brazil through Heteroskedasticity” by Christiano A Coelho (Central Bank of Brazil), João M P De Mello (Pontifica Universidade de Brazil PUC), Marcio Garcia (Pontifica Universidade de Brazil PUC), Roberto Rigobon (Massachusetts Institute of Technology- MIT).

²⁷ Rigobon (2003).

Box 2.2: Identification through Heteroskedasticity

The procedure solves the problem of estimation in simultaneous-equation models—such as those measuring demand and supply. It is based on the heteroskedasticity of the structural shocks and can be used when there are no acceptable instruments or when the standard identification assumptions (such as exclusion restrictions, long run constraints, etc.) cannot be justified. If the structural shocks have a known correlation (even zero) and if the parameters are stable, then the heteroskedasticity in the structural shocks—for instance, in monetary policy and demand shocks—increases the number of equations, allowing to solve the identification problem. The intuition, provided by Wright (1928), is that increases in shocks' variance in one equation (for instance, the supply through monetary policy action) reduce the bias in the OLS estimate in the other equation (e.g., demand). As a result, it can be used as an instrument in the identification strategy.

The identification occurs when order and rank conditions are satisfied. The order condition implies that: (i) the structural shocks must have zero correlation; (ii) the structural parameters must be stable across regimes; and (iii) there exist at least two regimes of different variances. The zero correlation condition can be relaxed by including common unobservable shocks in the specification. The rank condition requires that the number of linearly independent equations be equal to or larger than the number of unknowns. The method still applies when the heteroskedasticity is incorrectly specified. As long as the misspecified covariance matrices satisfy the rank condition, the estimates are consistent. The main limitation of the method is that it requires parameter stability; hence, the macro application needs to make the case for changes in the second moments with stable coefficients. Under those conditions, heteroskedasticity using this methodology can be used to identify the model and solve the simultaneous equations. The approach would not work with parameter instability, which is found, for example, in non-linear models.

2.29 The model tests the hypothesis that the variance of credit supply increases relative to the variance of demand in periods of high variance of interest rates. Monetary policy is a likely cause of volatility in interest rates. Prime rates are a cost of funds to banks, so their volatility is likely to directly impact supply. But volatility will affect demand only through bank interest rates. Changes in the ratio of unobservable supply and demand variances are equivalent to a random instrument. A normal instrument will shift demand deterministically but keep supply constant. If the identification hypothesis is correct, then supply will shift more than demand in periods of high variance.

2.30 Important fluctuations in the variance of interest rates are evident. This justifies the assumption specifying different regimes of variance in interest rates. Equally important, whenever the variance of interest rates is high, the correlation between interest rates and new loan concessions is negative. On the other hand, whenever the variance is low, the correlation between interest rates and new loan concessions is positive. This pattern supports the second identification assumption: when interest rates are very volatile—induced by volatility in monetary policy—the co-movement of interest rates and loans is dominated by supply. In this case, the variation traces the demand slope more closely and the correlation is negative. This also applies for periods of low volatility in interest rates.

2.31 On the basis of the analysis (see background paper), one can conclude that the supply of loans is fairly elastic, supporting the increased responsiveness of banks to monetary policy in the second part of the decade.²⁸ On the demand side, the elasticity varies with the type of loan. For most of the estimates, demand for consumer loans is fairly inelastic—

²⁸ In both cases, supply is positively sloped. However, caution is necessary because estimates are much less precise for supply than for demand, and they oscillate considerably across models.

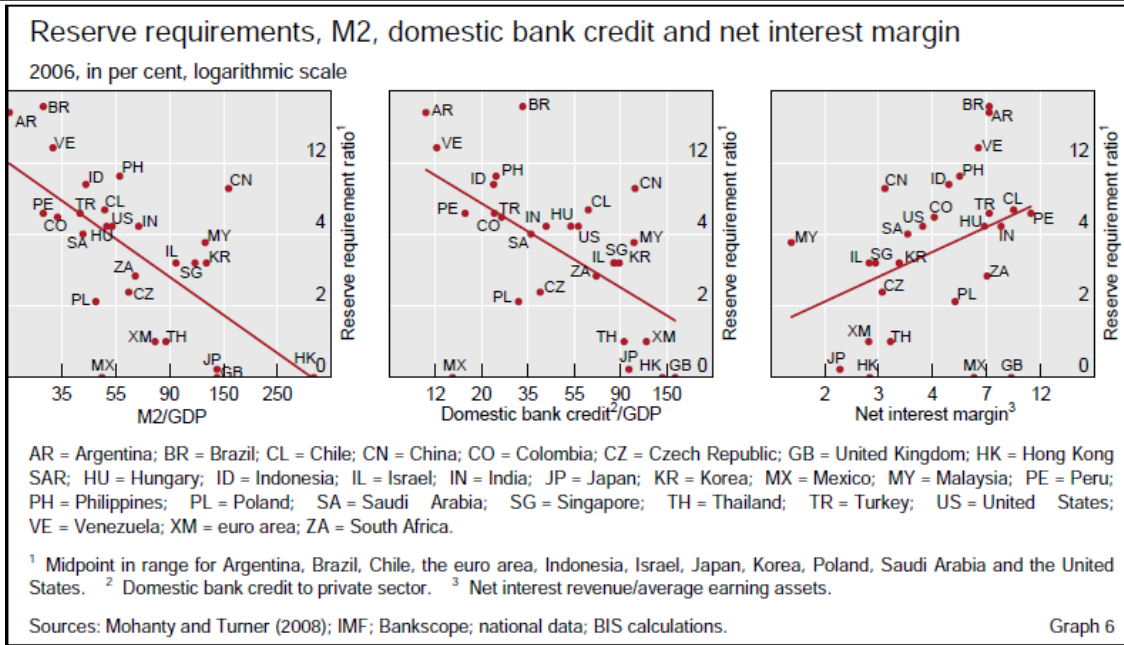
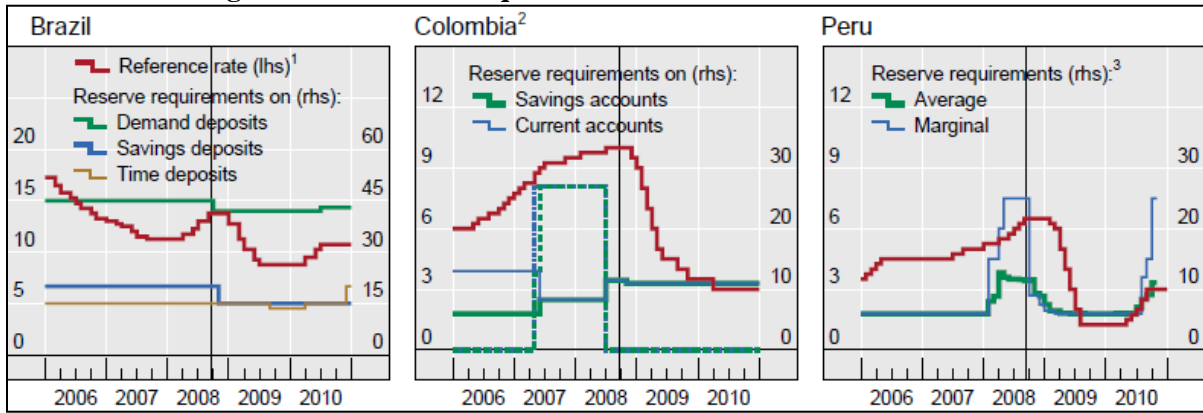
in fact, much more inelastic than for working capital. This finding is in line with the difference between trends in consumer and firm loans, where the former picked up more than the latter. However, this finding does not explain substitution effects, which led new loan instruments to help extend credit to many people in the second part of the decade. Another contributing factor is the many people entering the middle class and pushing up loan demand dramatically. The finding does not explain what is behind either the inelasticity of consumer credit demand or working capital credit. Consumer lending being unresponsive to interest rates may partly explain the persistently high spreads in consumer loans—even after the 50 percent decline over the past decade.

Channel III: Reserve Requirements

2.32 Reserve requirements in Brazil are high compared to other countries, including those in the LAC region and the US, UK, China, India, and Russia. Brazil's reserve requirements are 45 percent on demand deposits and 15 percent on time and savings deposits. Brazilian banks face an average effective mandatory reserve rate of 29 percent and an average effective credit requirement of about 16 percent on deposits (see Figure 2.1). Brazil's financial system is well-capitalized due to an expanding capital base over the past decade through profit retention and new capital issues. In December 2009, the banking system's Basel ratio was 18.6 percent, well above the 11 percent required under Brazilian regulations (Alencar, 2011).

2.33 Historically, reserve requirements have played an important role in Brazil's financial system stability (Box 2.3 describes the regulatory framework). Reserve requirements were used intensely in the *Plano Real*. In mid-1994, the Central Bank increased required ratios from 40 percent to 100 percent on demand deposits, from 15 percent to 20 percent on savings accounts, and from zero to 20 percent on time deposits. In the 18 months following June 24, 1994, there were 53 changes in various reserve requirement regulations. Increases in reserve requirements were used during the Asian crisis of 1997, the crisis of September 2001, the pre-election crisis of 2002, and the Banco Santos intervention in November 2004.

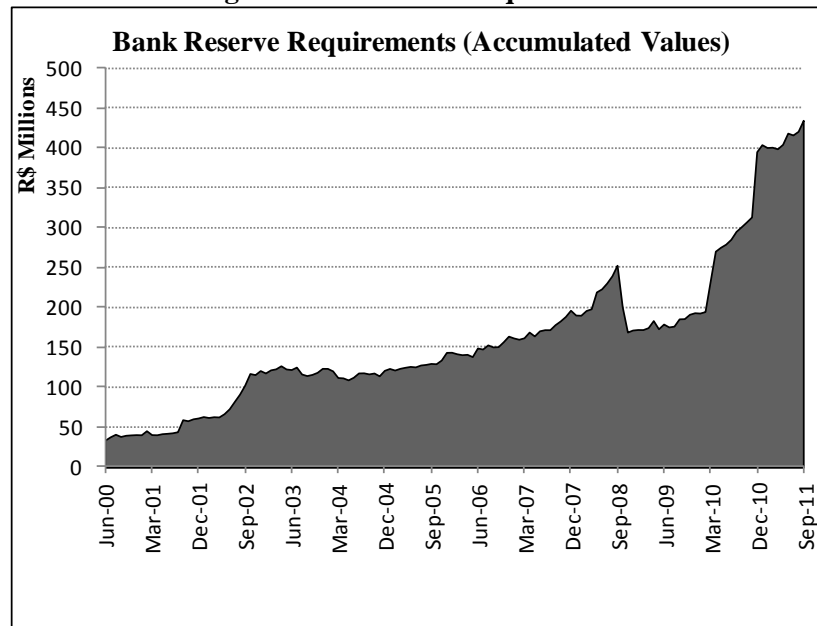
Figure 2. 1: Reserve Requirements and Reference Rates in Brazil



Source: Montoro-Moreno (2011)

2.34 **More recently, reserve requirements have been used as a macro prudential tool.** During the global financial crisis in 2008, they were reduced as a countercyclical monetary policy to stimulate credit growth. After January 2010, reserve requirements were increased to limit credit growth in an overheated economy (see Figure 2.2). The impacts in both cases have been direct and fast—as one might expect with a tool that requires commercial banks to hold minimum unremunerated (or under-remunerated) reserves against their liabilities, increasing the opportunity costs of lending, reducing credit, and raising interest rates.

Figure 2. 2: Reserve Requirements



Source: BCB

Box 2.3: A History of Reserve Requirements

Law 4.595/1964 created the National Monetary Council (CMN) and the Central Bank, attributing to these institutions the roles of supervising the national financial system (SFN) and acting to ensure regular functioning of the exchange rate market. In 1988, the Basel Committee on Banking Supervision (BCBS) established the International Convergence of Capital Measurement and Capital Standards, an agreement to create minimum capital requirements for financial institutions across member countries to control credit risk and enhance global financial stability. The 1988 agreement was implemented in Brazil through Resolution 2.099 in August 1994, introducing minimum capital requirements that vary with the degree of risk in bank operations. In 1996, the BCBS amended the 1988 agreement, incorporating into the capital requirements the need to cover a portion of market risks. In 2004, BCBS announced a revision known as Basel II, with the objective of finding a more accurate measure of risks held by banks active across international borders. This revised Basel agreement rests on three main pillars: (i) capital requirements, (ii) revision by supervision of the process of evaluation of adequate capital by banks, and (iii) market discipline. In December 2004, Brazil's Central Bank established a simplified timeline (outlined in *Comunicado 12.746*) for the main phases of implementing the new capital structure. The recent adoption of Basel III brought additional changes, including increasing capital requirements for select modalities of credit operations, the gradual reduction of the limit for capitalization of deposits with special guarantees, and the alteration of procedures for classifying and registering sales operations or transfers of financial assets.

2.35 A large body of international research concludes that reserve requirements promote banking-sector stability by reducing credit supply through limiting loan originations and increasing spreads. During the long period of low credit supply in Brazil from 1989 to 1994, capital requirements were considered one of the main culprits behind banks' decisions to restrict lending. Studies of this issue have taken two main approaches. The first analyzes the impact of rising capital requirements, investigating whether negative shocks in banks' capital led to reductions in credit supply. The second takes capital requirements as given and assesses their influence on the supply of loans to verify whether well-capitalized banks are less restricted by capital requirements and have more opportunities for expanding their credit portfolios.

2.36 Research indicates that capital requirements tended to be negatively correlated with credit supply in Brazil during 2000-2004 (see Blum-Nakane 2005) and that the effects are stronger for large banks due to progressive reserve requirement rates (see Takeda, Rocha and Nakane 2003). Other studies find a high correlation between reserve requirements and interest spreads (Soubrinho 2010; Gray 2011; De Souza-Rodrigues and Takeda 2004; Cardoso 2002; Souza-Sobrinho 2009; and Gelos 2008).

2.37 In the analysis that follows, reserve requirements are assessed as a countercyclical policy, discussing how reductions provided short-term liquidity, improved liquidity distribution, and increased credit supply.²⁹ Recall that reserve requirements are imposed on demand, time, and savings deposits in Brazil; the resulting reserves amount is deposited at the Central Bank in currency or public securities, interest-bearing or not. Typically, reserve requirements are defined by rate and a basis of calculation for their incidence. The computation allows for deductions on the basis of calculation as well as on the actual amount required. These deductions create a progressive structure in the requirements—i.e., banks with more deposits have proportionally higher reserve requirements. As a result, decreases in reserve requirements will have a greater impact on large banks.

2.38 Following the onset of the 2008 global financial crisis, Brazil experienced a severe liquidity squeeze, especially for small and medium-sized banks.³⁰ After easing reserve requirements, large and public banks will tend to be the first to absorb the newly freed resources. Complementary measures can be introduced to spread the added liquidity to the whole banking system. The Central Bank encouraged large banks to direct resources to smaller ones, including incentives for large banks to purchase small institutions' credit portfolios and deposit insurance intended to raise smaller banks' deposits.³¹

2.39 Did lower reserve requirements result in more new loans and increased credit volume? We use a differences-in-differences methodology with panel data, and two treatment groups: state-owned banks and large banks (i.e., those with total equity greater than R\$5 billion).

2.40 Our model examines two countercyclical episodes of reserve requirement interventions to assess whether small and large banks differ in lending behavior. The two measures considered are: (i) the relaxation of reserve requirements on large banks, conditional on the purchase of small banks' credit portfolios in October 2008; and (ii) increased insurance for deposits up to R\$20 million (US\$11million) in March 2009.

2.41 Our results indicate that banks increased their new loans after the easing of reserve requirements. The decrease in reserve requirements stipulated that the freed resources had to be used to buy credit or deposit portfolios from smaller banks. We find that the measure increased the liquidity of the system as a whole. Large banks and state banks increased their new loans to

²⁹ This section is based on the background paper: "Easing Reserve Requirements, Bank Lending, and Financial Stability in Brazil" by Paulo Evandro Dawid (Central Bank of Brazil) and Tony Takeda (Central Bank of Brazil).

³⁰ Smaller banks tend to be more affected by liquidity problems than larger banks, so public and large banks become relatively larger players during these episodes.

³¹ Barbosa (2010) estimated that the reduction in reserve requirements in 2008-09 corresponded to 3.3 percent of GDP.

firms and consumers. However, the increase in liquidity for small banks was accompanied by a decrease in new loans, particularly to consumers.

Conclusions and Policy Implications

2.42 Monetary policy is a crucial determinant of banks' decisions to supply credit and firms' decisions to demand credit. In Brazil, the main tools of the Central Bank are open market operations to keep the SELIC at the level consistent with target inflation and regulatory reserve requirements. Movements in the SELIC did not seem to influence bank lending decisions or the supply of credit during the first part of the decade (2000-2004), and higher interest rates only served to diminish banks' use of deposits as a financing source because depositors preferred to invest in government bonds. As the economy stabilized after 2004, monetary policy interventions began to exert a greater influence.

2.43 Our results indicate that banks fully adjust interest rates to a change in the monetary policy rate in the long run; however, the short-term elasticity varies a great deal with loan categories. Vendor loans demonstrate the greatest short-term responsiveness to changes in interest rates. In contrast, short-term responses are sticky for working capital, personal loans, and purchasing goods other than vehicles. The difference in the pass-through depends on loan maturities; transmission is greater for shorter maturities.

2.44 Banks fully adjust their short-term lending rates to changes in the base rate, but this is not the case for time deposits. The pass-through is complete in the long run for corporate loans but not for retail loans. The evidence further points to time-deposit interest rate stickiness, even in the long run, which may benefit from increased competition in the bank-funding market. The volatility of monetary policy is positively correlated with loan rates and negatively correlated with time-deposit rates, which reflects the risk aversion of banks to fluctuations in interest rates. As such, policies to increase competition in the bank funding markets and to decrease volatility of monetary policy would improve the effectiveness of monetary policy.

2.45 Some structural shifts have enhanced monetary-policy transmission. On the macro side, these include decreases in the SELIC rate, the levels and expected volatility of inflation, and the debt to GDP ratio; at the same time, there were increases in dollar-denominated reserves and fiscal surpluses. These have resulted in changes in the government debt composition and the inversion and lengthening of the yield curve over time. As the economy stabilized, bank behavior changed due to positive developments in the regulatory environment, funding structure, and risk perception. A growing economy strengthened firms' balance sheets, fueling demand for credit.

2.46 Despite the increase in monetary-policy effectiveness, new challenges have emerged in the post-crisis environment; namely, an influx of capital that adds liquidity to the system and needs to be sterilized by the Central Bank. Raising the tax on foreign transactions (the IOF) represents a first step to limit inflows—but will it be sufficient? The appropriate policy mix between interest rate instruments and/or macro prudential measures is particularly pertinent as inflation surges above the target band and credit continues to grow in some segments. In this context, new concerns related to the effectiveness of monetary policy have emerged. The share of lending by public banks compared to private banks has increased, which is associated with less effective monetary policy in affecting firms' investment decisions. Addressing these specific

concerns will be important to maintaining and enhancing monetary policy's impacts on credit and economic activity.

2.47 Despite relatively high reserve requirements, credit grew fast in the second half of the 2000s. This might indicate that reserve requirements are second-order constraints on quantity but first-order constraints on spreads (as will be seen in Chapter 4). During 2004-2008, the role of reserve requirements may have been limited to helping foster stability in already well-capitalized banks.

2.48 At the onset of the financial crisis, the use of reserve requirements as a countercyclical policy tool boosted liquidity, increased credit supply, and supported consolidation in the banking sector. At the same time, it may have reduced competition going forward. In sum, Brazil's reserve requirements have served their three main purposes—prudential, monetary control, and liquidity management (Gray, 2011). Since January 2010, reserve requirements were raised to reduce credit growth in some segments, and early evidence suggests that they contributed to reduced loan origination, shorter tenures, and increased costs. Future research should assess the long-term impact of these developments.

CHAPTER 3. MICRO FACTORS: THE ROLE OF STRUCTURAL REFORMS

In this chapter, we discuss the role of micro structural reforms in unleashing credit growth in Brazil. The macroeconomic reforms of the late 1990s produced immediate results for economic stabilization, but credit performance remained subdued. Within this context, the Central Bank launched a program of reforms to address structural shortcomings in credit provision related to transparency and information-sharing as well as contract enforcement and judicial risks. We conclude that the micro structural reforms and financial instruments implemented under the program were critical preconditions for the credit expansion experienced in the second half of the decade, particularly in nontraditional segments of the market. Nevertheless, the results achieved were only partial in some market segments, implying remaining shortcomings.

3.1 The macroeconomic reforms implemented in the late 1990s produced immediate results for economic stabilization. The *Plano Real* of 1994 and its subsequent reforms reduced inflation from triple digits in 1990 to single digits in 1996. The reforms also helped impose fiscal discipline through the restructuring and privatization of inefficient public companies and banks.

3.2 Parallel to the macro reform agenda, the Central Bank implemented a Program of Restructuring and Strengthening of the Financial System (PROER). Initiated in 1995, the program expanded the Central Bank's responsibilities for intervention and liquidation of troubled institutions. The program supported the restructuring of large private institutions that were liquidated or sold; sub-national public institutions were privatized as part of the reforms. By the end of the 1990s, more than seven private banks and such important state banks as the Banerj and Banespa had been restructured.

3.3 Within the newly stabilized macroeconomic environment, the restructuring was expected to create a sound financial system and encourage credit expansion, especially in non-earmarked lending. But reality fell short of expectations, reflected in stagnant aggregate credit volumes (around 25 percent of GDP in 1999), a high proportion of earmarked resources (45 percent of total lending), and some of the world's highest lending interest rates (averaging 83 percent) and banking spreads (averaging 62 percent).

3.4 In this context, the Central Bank launched the Bank Interest and Spread project in October 1999. It developed a diagnostic of the main factors behind the high costs and shallow depth of the Brazilian financial sector. Based on the diagnostic, it proposed a reform agenda covering key areas of performance and monitored its implementation through annual reports.

3.5 The Bank Interest and Spread diagnostic (1999) identified default costs as the largest component of Brazil's cost of credit, accounting on average for 35 percent of bank spreads. Default costs are significant for all types of credit and are a proxy for riskiness. The diagnostic and Central Bank reports link high default costs with several factors. First, default rates and costs are higher in unstable macro environments, which make it more difficult for firms and individuals to evaluate and identify profitable projects. Second, negative shocks can affect firms' and individuals' ability to repay debts even when expected profits are positive, leading to defaults. Annibal and Koyama (2011) find evidence that macroeconomic factors affect the probability of default in Brazil; such negative shocks as appreciation of the dollar against the

Real, increases in the SELIC rate, or decreases in economic activity all lead to a significant increase in corporate defaults.³² The Central Bank project addressed the high spread issues along many dimensions including through policies to promote financial sector stability and sound monetary and bank regulation policies such as through reserve requirements (see Chapter 2). The nexus being that in a more stable environment risk could fall and as such reduce spreads.

The Role of Information and Institutions

3.6 Default costs are also high when banks cannot assess and correctly price borrowers' risk. This situation is usually associated with information asymmetries between borrowers and lenders, frequently leading to distortions in credit market equilibrium, such as credit rationing or excessive interest rates. As pointed out by Stiglitz and Weiss (1981), the interest rate a bank charges may itself affect the riskiness of its pool of loans. This effect occurs through adverse selection (riskier individuals are more likely to borrow at high rates) or through changes in individual behavior (when interest rates rise, borrowers can justify riskier projects). When banks cannot fully assess borrowers' risk, the loan rate that maximizes bank profits may be lower than the one that equates supply and demand. Stiglitz and Weiss (1981) also consider cases in which banks, seeking to account for adverse selection, set interest rates above the level needed to equate supply and demand, attracting mainly risky borrowers. Default rates and costs are even higher under this scenario. Information asymmetries can also play a role after loans are granted. These ex-post information asymmetries arise when monitoring is costly or contracts are incomplete, which can lead to moral hazard problems, such as shifting investment risks and reducing repayment effort. These problems lead to higher default rates and costs (Gale and Hellwig 1985; Williamson 1986).

3.7 Mechanisms for screening credit risks are particularly underdeveloped in Brazil. The use of credit bureaus and the development of credit-scoring models may help mitigate asymmetric information, reducing rationing. To date, credit bureaus in Brazil have narrow coverage and credit-scoring technologies fall short of international practices. Due to the lack of effective debtor information, such as financial data, debt exposure, and guarantees, banks frequently rely on self-gathered data to determine risks. Instead of projecting risk/profitability, credit allocation tends to be based on imperfect indicators of firm risk, such as age, size, property structure, and ongoing relationships between firms and banks (Kumar et al. 2005).

3.8 In addition, credit reporting in Brazil typically has been based almost exclusively on dissemination of negative information on consumers, such defaults and delinquencies. This serves a two-fold objective: (i) to prevent other institutions from being exposed to consumers who represent higher risks because of their tarnished credit histories; and (ii) to use the threat of inclusion in these databases as an instrument to encourage timely payment of obligations. However, negative information is not adequate for sound credit market operations. Creditors cannot price loans based solely on information about debt arrears. From the point of view of consumers, the absence of fuller credit background information prevents good clients, who pay their bills on time, from being rewarded for their punctuality. The burden of this process falls mostly on low-income families and small companies. According to a survey of financial institutions by Pinheiro and Moura (2001), the negative information provided by bodies such as

³² The study concludes that economic activity – proxied by industrial production – causes the largest impact on defaults compared to the other variables. The peak effect occurs four months after the shock and lasts 12 months.

CDLs, SERASA, and the Credit Protection Service (SPC) proves to be the decisive – if not the sole – factor in lending decisions in the retail banking market. For this reason, the Central Bank project defined transparency and information-sharing as a key area of reform.

3.9 Finally, Central Bank reports recognize that default problems can be amplified by institutional factors. The use of collateral, well-designed contracts and regulations, and risk-screening instruments may help mitigate costs associated with asymmetric information, including default costs. But the effectiveness of such mechanisms is related to the institutional and legal frameworks. Even when contracts are well-designed, they fail to encompass all potential contingencies. For this reason, an effective system of property registration, contract enforcement, and dispute resolution is fundamental for the efficient operation of financial markets. This is well-documented. For example, La Porta et al. (1997) find that a lower degree of creditor protection implies smaller debt and equity markets. Moreover, impediments to the writing and enforcement of contracts have been advanced as some of the most important obstacles to financial development in poor and middle-income countries.³³ An increase in the probability of breaking financial contracts or expropriating collateral increases the costs associated with credit operations, shifting the supply of loans inward and worsening credit market performance.

3.10 Many studies have estimated the impact of inefficiencies in conflict resolution and contract enforcement on Brazil’s credit market. These inefficiencies include delays in court decisions, costs of judicial process, and a lack of fairness and predictability in court decisions. Aith (2000) estimates that 10 to 30 percent of Brazil’s bank spreads can be explained by high judicial costs. In a cross-country analysis, Pinheiro and Cabral (2001) control for differences in per capita income and judicial performance, which explain a significant portion of the differences in countries’ financial depth. Leaven and Majnoni (2003) find evidence that judicial risks, together with inflation, are the main determinants of bank spreads.

3.11 Inefficiencies of the Brazilian judicial sector and their impacts on default costs are well-documented. In surveys of entrepreneurs and magistrates on the judicial process and court decisions, Pinheiro (2000, 2001) documents that 91 percent of entrepreneurs view the judicial sector as slow or too slow, and 45 percent of magistrates share this opinion. Confirming this perception, the 2004 Doing Business shows that it takes an average of 636 days to enforce a contract in Brazil, placing the country 99th out of 145 economies. Slow court decisions affect credit outcomes in several ways: (i) long trials tend to benefit debtors by stretching out the terms for repayment; (ii) warranties tend to depreciate during long lawsuits, decreasing recovery values; (iii) slow court processes create a perverse incentive for using judicial process as a way of delaying payment, even when debtors intend to pay. Pinheiro (2001) indicates this is a frequent practice in Brazil. Another important problem is the high cost of legal expenses, which represent 13 to 40 percent of recovered value. Creditor expenses increase significantly with the duration of the process (see Table 3.1). Finally, court decisions tend to favor debtors despite the creditors’ legal rights. Pinheiro (2001) also reveals that nearly three-fourths of surveyed magistrates would rule against written contracts to promote social fairness. These shortcomings motivated the Central Bank’s reform agenda on contract enforcement and judicial risks.

³³ See Banerjee and Duflo (2005), Banerjee and Moll (2010), Leaven and Majnoni (2005), and Levine (1998).

Table 3. 1: Judicial Expenses – Expected Recovery Rate for Credit Contracts

	R\$500	R\$1,000	R\$5,000	R\$50,000
Simple extrajudicial claims	R\$284	R\$680	R\$4,003	R\$41,498
(less than a year)	56.8%	68.0%	80.1%	83.0%
Judicial Presentation	R\$14	R\$221	R\$1,982	R\$21,878
(less than 3 years)	2.80%	22.1%	39.6%	43.8%
Judicial Execution	zero	R\$33	R\$1,011	R\$12,054
(up to 5 years)	0.0%	3.3%	20.2%	24.1%

Source: Central Bank, Fachada Figueiredo and Lundberg (2003)

Key Micro Reforms and their Impact

3.12 **The Central Bank project implemented a broad set of structural microeconomic reforms beginning in 2000** (Table 3.2 presents the timeline of reforms). The project initially included measures to improve transparency and client information and foster competition in the banking system. These were followed by the expansion and strengthening of the Central Bank’s credit-risk database to improve information sharing and systemic risk analysis. The reforms also benefited from new financial instruments that help circumvent information and conflict resolution problems, such as payroll credit (*credito consignado*) and trust deeds contracts (*alienação fiduciária de bens*). The final elements of the program aimed to improve contract enforcement and conflict resolution. Key initiatives in this area were the modernization of the Brazilian Bankruptcy Code and judicial reform. The following subsections describe the implemented reforms in more detail.

Transparency and Information

3.13 **The first step under the Central Bank project was improving transparency and information about banks’ products and costs.** In May 2000, the Central Bank had already begun the systematic publication of fees and rates charged by financial institutions, allowing consumers of banking services to compare costs among different institutions. Simultaneously, all financial institutions were mandated to provide the Central Bank with daily detailed information on credit operations—so that the fees and costs released to the public represented the most recent information. Resolution 2.835 in April 2001 further improved transparency by mandating banks to produce at no cost to their customers monthly reports with detailed information on all charges related to overdrafts in the period. These reforms served two purposes: (i) reduce information barriers and foster competition by informing clients about options in the market; and (ii) provide the Central Bank with systematic records of banks’ charges and rates for different products.

Table 3. 2: Timeline of Reforms

Date	Reform	Instrument	Objective
May 2000	Transparency in bank operations —BCB releases information on interest rates charged by banks, and banks are asked to provide daily detailed information of credit operations to the BCB.	Circular 2957 30.12.1999/ Announcement 7569 25.05.2000	Transparency
Jan. 2001	Creation and consolidation of the central risk registry —Reduce the minimum value of operations to be recorded in the BCB registry from R\$50,000 to R\$5,000.	Circulars 2.938 14.10.1999 and 2.999 24.8.2000	Information sharing
April 2001	Promote competition in overdraft services —Banks must produce at no extra cost monthly reports, including detailed information of all charges relative to overdrafts.	Resolution s2.808 2000 and 2.835 2001	Transparency
2003	Change in the order of priority for payments in the event of bankruptcy —Places real-collateral loans before the tax authorities and maintains the top priority of labor debts.	Law number 72 2003	Reduce judicial costs and risks
Jan. 2004	Payroll personal credit —Creates and regulates the conduct of loans paid through payroll deductions.	Law 10.820 17.12.2003	Reduce judicial costs, default risks, mitigate information asymmetries.
July 2004	Upgrade of the Central Risk registry to a new Credit Information System —Improve the reach and quality of the information on the Credit Information System as well as facilitated its use by financial institutions. Banks should inform the BCB monthly about its credit risk and individual credit operations above R\$5,000. Additional information is required every six months.	Circular 3.098 20.03.2002	Information sharing
2004	Trust deeds for assets (<i>alienação fiduciária de bens</i>) —Expands the reach of regulation that allows for the creditor to hold title until the payment is complete. The reform expanded from movable goods to other types of goods and rights.	Law 10.931 2004/ MP 2.160-25 2001	Reduce judicial costs and default risks, mitigate information asymmetries
2004	Other reforms for resolving costs of conflict resolution —Reform of the Judiciary Branch.	Constitutional Amendment 45, 2004	Reduce judicial costs and risks
2005	New Bankruptcy Act —Encourages the recovery of economically viable companies (including banks) or speeds up the sale of their productive assets to preserve their productive capability.	Law 1.101/2005	Reduce Judicial Costs and Risks
Aug. 2008	Creation of the Banking Credit Bills (CCB) —Disseminates the utilization of credit bonds that facilitate judicial claims. Being an executable judicial bond, CCDs speed up and reduce the costs of judicial claims.	Law 10931 2.8.2004/MP 2.160-25 23.8.2001	Reduce Judicial Costs and Risks, mitigate information asymmetries
March 2011	Use positive credit information in credit rating agencies	TBD	TBD

3.14 **The Central Bank information agenda continued with the expansion and consolidation of its Credit Information System.** In 2001, the government created a credit risk registry to systematically record credit operations above R\$5,000. In 2004, the registry was upgraded to a new Credit Information System that improved the reach and quality of the credit database and facilitated its use by financial institutions. Under the system, banks must inform the Central Bank monthly about its credit risk and individual credit operations above R\$5,000 and provide additional detailed information every six months. The system includes both positive and

negative credit records. The new system was accompanied by a series of dissemination activities to explain the content and possible uses by borrowers and financial institutions. The Credit Information System is an important tool for assessing credit risk in the financial system. It assists the Central Bank in bank supervision and provides information for financial institutions to assess the payment capability of their clients. The information stored by the system is used by the Central Bank to assess the risk exposure of each financial institution as well as overall systemic risk. In addition, financial system clients may authorize access to their credit information by other banking institutions, reducing information asymmetries.

3.15 Measures to increase transparency were important in reducing cost dispersion among banking institutions, but only a few segments saw lower lending rates. Nakane and Koyama (2003) document the behavior of loan-rate dispersion across banks for different loan categories, concluding that reducing search costs helped cut loan-rate dispersion, but it had little effect on average rates. For overnight lending and overdraft lines of credit and personal loans, banks charging lower lending rates raised their rates; those charging higher lending rates posted decreases. For discount of promissory notes, working capital, finance for goods acquisition, and personal overdrafts, rates declined for the top quintiles but no changes were observed for the bottom quintiles. Working capital was the only sector to show widespread reductions in lending rates, which was probably driven by the greater mobility associated with this kind of lending.

3.16 The expansion of the Credit Information System helped improve default risk forecasting. Schechtman (2006) considers two important aspects of the Credit Information System—the availability of non-negative credit information and the sharing of information across financial institutions. He found that adding the registry helped improve precision in default forecasts in both dimensions, resulting in credit expansion and lower default rates.

3.17 Despite improvements, information-sharing under the Credit Information System has limitations, and information gaps remain. First, the system only records operations above R\$5,000, leaving out small transactions and small clients. Second, credit information can only be shared under the client’s authorization. These limitations create gaps in the system by excluding a large number of borrowers—in particular, risky ones. In most countries, this gap is filled by credit rating agencies that collect information on all types of clients and transactions, and this information can be accessed by anyone with a valid reason. Until very recently, however, these agencies were only allowed to collect and share negative credit information in Brazil.

3.18 In May 2011, the Brazilian Congress approved the project for converting Provisory Decree 518 of December 2010 on positive credit agencies into law. The measure authorized, under prudential rules, the collection, analysis, and sharing of positive credit information by credit agencies, allowing for the expansion of credit records at lower cost for most small clients. However, this measure has not been fully implemented. While it is too early to assess the impact of positive credit ratings in Brazil, cross-country evidence supports the idea that such systems contribute to credit-market deepening.³⁴

³⁴ Jappelli and Pagano (1999) developed a survey of credit registries. Their analysis suggests that the performance of credit registries, proxied by years of existence and the type of information that they share (positive, negative, or both), has a significant positive impact on the amount of consumer credit and total credit granted by the financial

Conflict Resolution and Judicial Risks

3.19 A second set of measures by the Central Bank project consists of reforms and innovative financial instruments that help mitigate costs associated with contract enforcement and conflict resolution.

3.20 Payroll-linked credit was the first innovative instrument created for reducing court risks in personal credit operations. Payroll credit—an instrument that allows debt payments to be deducted directly from borrowers' paychecks—has been available to public servants in Brazil since a December 1990 federal law enabled debt payments through direct deductions. Law 10.820 in December 2003 extended this credit instrument to formally employed workers and pension recipients. Through agreements involving unions, employers, and financial institutions, borrowers can commit up to 30 percent of monthly income. The instrument eliminates the need for voluntary payments and court enforcement, which is usually reflected in lower lending rates (discussed further in Chapter 5). Two additional facts contribute to lower lending rates under payroll credit: (i) loan negotiations with firms and unions usually grant borrowers additional bargaining power and the ability to extract rents; and (ii) the low risk associated with payroll credit led many small institutions to specialize in this type of loan, creating added competition in this segment for the large banks.

3.21 Payroll credit has had a significant impact on increasing access and reducing the cost of personal credit operations. Seven years after implementation, the payroll deduction instrument accounts for R\$100 billion in loans—2.7 percent of GDP. Families are paying less than half the interest rates they would have faced through traditional credit instruments.³⁵ The impact of payroll credit seems to be concentrated in specific borrower types, namely public employees and social security beneficiaries (see Chu, Lundberg, and Takeda 2007; Madeira, Rangel, and Rodrigues 2010).

3.22 Madeira, Rangel, and Rodrigues (2010) focus on the impact of payroll credit on the occupational choices of social security beneficiaries. The authors find a dramatic increase in the amount of credit potentially available to pensioners; comparing changes in behavior for pensioners and non-pensioners among elderly individuals, they conclude that the availability of credit through this payroll instrument is positively correlated to the probability of engaging in entrepreneurial activities. The results are particularly strong in relatively capital-intensive sectors like agriculture and ranching; they are not significant among relatively labor-intensive sectors. The analysis of intensive margin choices, such as the number of hired laborers, indicates an increase of 4.5 percentage points in the probability of having more than one employee. These results illustrate the extent and negative effect of credit constraints in the Brazilian economy.

sector and a negative impact on nonperforming loans. Note however that their analysis considers only a limited number of countries—at most 31 and in some regressions only 17.

³⁵ Rodrigues, Chu, Alencar, and Takeda (2006) match payroll credit and traditional credit operations by client and operation characteristics to estimate the difference in lending rates associated with payroll lending's lower default risks (and not differences in the pool of individuals, terms, and volume of credit operations). They estimate the difference in simple averages between the interest charges from the two types of operations at 26.74 percentage points. After controlling for individual, bank, and operational characteristics, the gap falls to 12.73 percentage points.

3.23 Payroll loans do not have a broad reach among private sector employees due to high enforcement costs and default risks associated with labor turnover. Chu, Lundberg, and Takeda (2007) and Madeira, Rangel, and Rodrigues (2010) identify setup costs as the first obstacle for private employees, given that employers, in coordination with unions, need to sign a formal agreement with a bank allowing direct payroll transfers. More important, however, Brazilian banks have shown little interest in large-scale payroll credit to private workers. Job losses and turnover are frequent among private workers, and borrowers are only required to repay while working for the same employer. This excessive borrower safeguard is, in fact, detrimental to workers. The authors suggest that a few contractual adjustments could help align incentives and increase the effectiveness of payroll credit for specific borrower types.

3.24 A second important Central Bank innovation was the introduction of trust deeds for collateral (*alienação fiduciária de bens*). The use of collateral is broadly accepted as a way to reduce creditor risk and mitigate the impact of information asymmetries. However, the effectiveness of collateral depends on lenders' ability to act on the pledged asset. The approval and regulation of trust-deed contracts for fixed (Law 9.541, 1997) and movable (Law 110931, 2004) assets helped enhance the effectiveness of collateral in Brazil. Credit operations based upon trust deeds have important advantages over other traditional collateralized loans. Under these contracts, the creditor is entitled to ownership of the asset covered by the credit, and the debtor only takes indirect possession of the good and its use. Foreclosures are simplified in this case because the creditor is the trustee owner of the good. In case of default, the creditor has the legal right to sell the asset, retain the amount owed, and return the remainder to the borrower. This reduces the risk—and thereby the costs—associated with executing collateral.

3.25 The main impact of trust deeds was to allow for collateralization of non-traditional assets to help expand access to credit. Beneficiaries include individuals or companies—in agribusiness in particular—that lacked adequate guarantees to obtain credit on favorable terms. The fungible nature of a good that can be consumed in the process brings about difficulties in using it as collateral for a credit operation. But appropriate financial engineering of the transaction can adjust the reduction of the value of the guarantee to the flow of payments for the financing, such that producers gain access to credit using raw materials as collateral. In the case of the fiduciary transfer of credit bonds, the contract introduces an alternative to the simple transfer of rights that allows the holders of receivables or securitization bonds to access financing by transferring the fiduciary ownership as a guarantee.

3.26 The innovation of trust deeds has also been associated with credit expansion and lower rates in traditionally collateralized segments. Ozawa and Nakane (2011) employ standard regression analysis as well as the treatment effects research to compare working capital financing operations that differ in the use of collateral. Mitigating endogeneity effects in the allocation of loan type by controlling for a range of borrower, bank, and operational characteristics, they find that collateral is negatively correlated with lending rates. This result suggests that collateral mitigates asymmetric information in bank lending by providing assets to be seized in case of default, reducing banks' losses. In addition, the threat of losing assets should incentivize borrowers to develop projects and repay loans. Moreover, by signaling borrowers' quality and by reducing default and dispute costs, collateral helps to circumvent the inefficiencies of the Brazilian legal system, reducing costs for borrowers and lenders.

3.27 The Government's strategy also included reforms to reduce insolvency risks and strengthen creditor rights. The new Bankruptcy Law (Federal Law 1.101/2005) represented a significant step forward by integrating the insolvency system into the country's broader legal and commercial systems, favoring company reorganization and recovery and encouraging informal workouts and rescheduling arrangements (i.e., extrajudicial recovery procedures).³⁶ Creditors play a more significant role in recovery procedures, including negotiating and voting for the reorganization plan.

3.28 The new Bankruptcy Law strengthens the creditor's position in two ways: it increases the priority of secured credit claimants and improves the efficiency of liquidation procedures. The previous law ranked secured creditors as the third claimant after employees (unlimited) and fiscal credits. Secured creditors are now the second claimant after employees' claims up to R\$20,000 (approximately US\$12,000). Unsecured creditors have also risen in priority above some tax credits. Any new credit extended during the reorganization process is given first priority in liquidation. Under the new liquidation procedures, a firm is allowed to be sold before the creditor's list is constituted, speeding up the process and increasing firm values under the bankruptcy procedure. Finally, tax, labor, and other liabilities are no longer transferred to the buyer of a property sold in liquidation.

3.29 Efficient dispute resolution ensures that the process of contractual implementation occurs swiftly and without high additional costs for both parties. This has not been the case in Brazil, where firms and individuals have dedicated a large share of their resources to legal and court expenses, to the detriment of production. In December 2004, the Executive Branch, the Supreme Court, the House of Representatives, and the Federal Senate entered into a pact for a swifter Judicial Branch capable of providing more efficient and accessible judicial services. The pact included constitutional reforms, improvements to procedural and dispute-resolution mechanisms, and the modernization and rationalization of court management.

3.30 The constitutional reforms aimed at making the Judicial Branch more transparent and efficient included external controls over judges, modernizing the judicial career statute, streamlining legal proceedings, strengthening public defense, and granting special treatment for crimes against human rights. An important provision of the reform is the binding effect of Supreme Court rulings, a change aimed at limiting excess appeals that unnecessarily overburden the courts. This measure granted more effective power to jurisprudence by limiting or even preventing the filing of appeals to higher courts on matters already covered by published digests. The provision prevents the use of appeals to the Supreme Court for mere procrastination, allowing cases to be resolved more quickly.

3.31 In response to wide variations in managerial and operational performance in courts around the country, harmonization of administrative procedures using "best cases" as benchmarks sought to bring substantial efficiency gains and improve court services. Initiatives included: electronic trial information, on-line cross examination, electronic personal legal notice system, electronic book of sentences, on-line registry of documents, and the System

³⁶ The previous bankruptcy law, unchanged since 1945, was highly ineffective in terms of creditor protection; creditors' recovery rate was a mere US\$0.002 on the dollar in Brazil, considerably below the average of US\$0.26 in the rest of Latin America and US\$0.72 in OECD countries.

of Transmission of Images and Documents. Conciliation Centers were established as an alternative dispute resolution mechanism, and drive-through registry systems were created. Creditor protection and court modernization measures appear to have had favorable results. For example, Araujo and Funchal (2008) find substantial evidence that the new Brazilian Bankruptcy Law was associated with a lower cost of debt, easier access to long-term credit, and the overall expansion of credit operations to firms. While no formal evaluation of court reforms has yet been developed, general court productivity and cost indicators are consistent with improvements in the system. Despite the continuous increase in the number of cases, congestion rates and judicial costs have been declining at all court levels and for most types of cases, including credit-related claims. Nevertheless, the rates are still high compared to the rest of Latin America.

Conclusions and Policy Implications

3.32 The micro structural reforms and financial instruments implemented in the early 2000s were critical preconditions for credit expansion later in the decade. The government's program of reforms enabling improved information-sharing, contract enforcement, and conflict resolution laid the groundwork for increasing credit supply and achieved important gains in expanding access and reducing the cost of credit, particularly in nontraditional segments of the market. Nevertheless, the results achieved were only partial in some cases, and some shortcomings remain. For example, the Credit Information System created by the Central Bank provides good quality positive credit information, but it represents only a fraction of borrowers, failing to account for small transactions and small clients. Payroll credit has been very successful in expanding access for public employees and pensioners, but it had a limited impact for private employees. Trust deeds played an important role in expanding collateralized operations and reducing disputes, and particularly judicial disputes in collateral execution. Nonetheless, disputes that are resolved in court still face high costs and long delays.

3.33 Because some key issues were only partly addressed, the credit supply expansion did not fulfill its potential. In fact, credit supply was outpaced by increases in credit demand (Cunha, Sakho, and Jesus 2010). While credit supply evolved smoothly and positively, credit demand fluctuated with economic activity, leading to procyclical credit shortages (discussed further in Chapter 5). These problems were particularly severe during the high-growth periods before and after the global financial crisis. Persistent credit shortages imply remaining issues related to asymmetric information.

3.34 Moving forward, a strategy for improving financial performance and reducing distortions could focus on further reducing the impact of information asymmetries. The first area of action is to expand the reach of public and private credit registries and improve the quality of credit information. This action is in line with recent legislation regulating the activities of positive credit bureaus in the country.

3.35 A second area of policy action might focus on the role of collateral. Policy options include: (i) improving registry systems for movable and immovable assets, making it easier for agents to claim ownership on assets, which can in turn be pledged as collateral; (ii) further improving the efficiency and reliability of the legal system for collateral claims in the event of default by defining performance targets and rewarding good performers; (iii) reforming the design of payroll loans to strengthen repayment commitments in the case of employment

termination by including a mechanism to transfer the responsibility of discounting the credit payments from the old employer to the new employer; and (iv) developing systems for collective collateral.

CHAPTER 4. THE COST OF CREDIT³⁷

In this chapter, we consider the high cost of financial intermediation in Brazil and its persistence over time despite changing underlying economic conditions. The stylized facts of high spreads concurrent with rising private sector credit, robust economic growth, modest inflation and a moderating SELIC raises questions about the determinant factors behind sticky spreads. Although earlier studies find macro factors provide the strongest explanation in the post-hyperinflation period of 1997-2005, the analysis using a large cross-country micro-level data set concludes that micro factors are in fact the binding constraint.

4.1 As discussed in Chapter 1, Brazil’s banking system has long been characterized by very high interest rate spreads, reflecting the high cost of financial intermediation. High interest rate spreads imply a high cost of credit, an investment disincentive that curbs economic growth. Although spreads have declined significantly from over 50 percent in the late 1990s to around 35 percent in 2009 (using the IMF IFS definition, see Figure 1.7), they remain far above average spreads in the LAC region and in BRIC countries (see Figure 1.8). As shown in Table 1.2, average bank spreads in Brazil were triple the LAC regional average in 2000-2006. In addition, as a measure of financial depth, private credit to GDP is only about half the LAC average and a third of other developing countries’ average.

Determinants of Spreads

4.2 Many factors contribute to the high cost of financial intermediation in Brazil, and it is useful to examine how they have evolved over time and how they differ from other countries. Banks set their interest spreads – or profit margins – based on a range of factors. Banks could, for example, set spreads based on macro factors because loans go to a broad spectrum of firms and individuals whose ability to repay is correlated with the health of the overall economy and their sectors. Recall from Chapter 3 that negative macroeconomic shocks such as changes in the SELIC rate, the dollar/Real exchange rate, or industrial production increase the prevalence of corporate defaults, with the largest impact stemming from industrial production (Annibal and Koyama, 2011).

4.3 On the other hand, factors such as specific taxes and provisioning rules raise the cost of bank operations, which could be passed on to consumers through higher interest spreads. The market structure of the banking sector could also have an impact if, for example, the state takes an activist role in directing credit to priority sectors. Brazil through gives the state a large role in credit allocation through BNDES, rural and housing credit schemes, and other programs.

4.4 For the purposes of this analysis, factors are classified into three camps:

- As discussed in Chapter 1, macroeconomic stylized facts include high inflation, interest rate volatility, growth prospects, debt levels, fiscal sustainability indicators, and the level of the basic interest rate (SELIC).
- As presented in Chapter 3, microeconomic factors include the institutional and regulatory framework facing lenders and borrowers, and the environment for contract enforcement.

³⁷ This chapter is based on the background paper by Jorgensen and Apostolou (2011).

Regulatory restrictions include reserve requirements, interest rate restrictions on deposits, and directed lending and cross subsidies, for example.

- The third category of factors that affect spread levels relates to the market structure of the banking sector; when competition is weak, the ancillary costs of borrowing such as fees and commissions tend to be high as borrowers face a narrow choice of financing options (as discussed in Chapter 1).

Measurement Issues

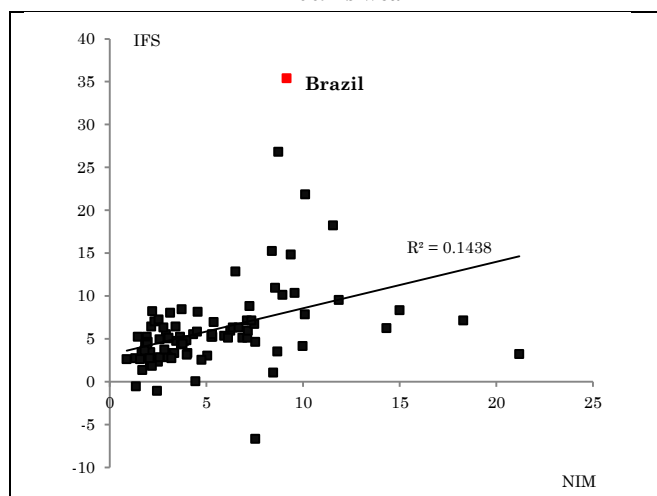
4.5 Research on spreads in Brazil and worldwide includes a range of methodological approaches and a wide range of data sources. Measuring the difference between what banks charge borrowers and what banks pay depositors – i.e., the spread – is not straight-forward, given that individual banks charge varied loan rates to a range of customers on a range of lending products. Similarly, banks pay depositors a range of interest rates depending on minimum deposit levels and maturities. Moreover, banks typically charge fees and commission that are not captured in these spreads but nevertheless increase the cost of financial intermediation (Brock and Suarez, 2000).

4.6 To draw lessons for Brazil, it is important to differentiate among the methodological and measurement approaches to ensure comparable definitions.³⁸ For example, the IMF's International Financial Statistics (IFS) provide spread data across countries for average interest rates, and but data availability and definitions vary across countries. For example, the data include differences in maturities, fixed vs. variable interest, credit worthiness of creditors, etc. As such, the IFS data would not offer a basis for robust cross-country comparison of interest spreads. Another measure, the net interest margin (NIM), by contrast, provides a better measure for comparing spreads across countries because it covers a wide range of borrowers and several types of interest rates and is more homogeneous in many respect. It is worth noting that there is a weak link between the IFS spread measures and the net interest margin (see Figure 4.1) indicating that they are measuring very different things.

³⁸ For a detailed discussion of methodological challenges, see the background paper by Jorgensen and Apostolou (2011)

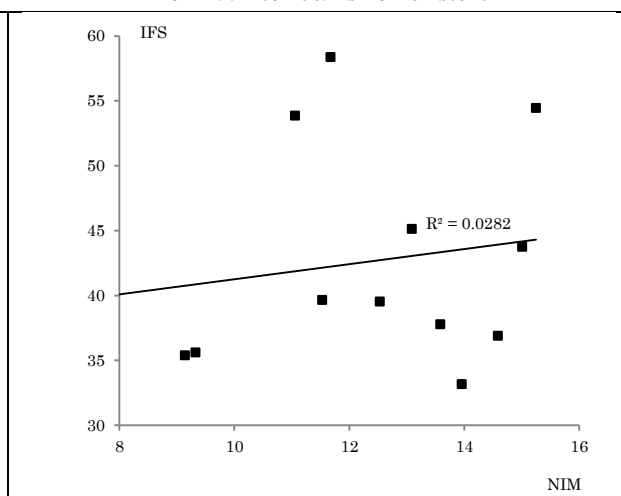
Figure 4. 1: The link between IFS and NIM across countries (2009) and over time in Brazil

Figure 4.1a. The link between IFS and NIM across countries in 2009 is weak



Source: Authors' calculations based on BankScope data

Figure 4.1b. The link between IFS and NIM in Brazil from 1997 to 2009 is non-existent



Source: Authors' calculations based on BankScope data

4.7 Measurement issues with the NIM can be smoothed out to arrive to a “pure spread measure” that can be compared across countries. Countries have different institutional and regulatory features that also need to be taken into account in deriving a comparable measure for spreads when using the NIM. One method involves adjusting the net interest margin to arrive at a “pure spread” along the lines of Saunders and Schumacher (2000), Brock and Rojas Suarez (2000), and Maudos and de Guevara (2004). The following section summarizes the main findings of these studies.

Evidence on Spreads Post-Hyper Inflation: the Macro Story

4.8 An extensive literature examines Brazil’s persistently high interest rate spreads. Recall from Figure 1.9 that interest rate spreads are highly correlated with the SELIC. Although the SELIC declined substantially during the 2000–2008 macroeconomic stabilization, it was high compared to other countries. The high SELIC was believed to be the driving force behind high interest rate spreads, and de la Torre et al. (2006) analyze the reasons for a high SELIC using average net interest margins. Three plausible hypotheses emerge. The first hypothesis contends that the high level of the SELIC results mainly from debt and fiscal risks. The second is a multiple equilibria hypothesis that attributes the high SELIC to an unfortunate equilibrium implied by a high risk of debt default. In this scenario, macroeconomic debt fundamentals explain a large fraction of the SELIC rate. Fiscal reform has a positive impact on the sustainability of the public debt and hence on reducing the SELIC rate. In addition, fluctuations in the SELIC are of a similar order of magnitude as fluctuations in the estimated default risk.³⁹ The third hypothesis points to weak institutional factors that create “jurisdictional uncertainty,” pushing the SELIC higher.

4.9 In a single-country study, Afanasieff, Lhacer, and Nakane (2002) use the two-step approach from Ho and Saunders (1981) to measure the relative importance of the micro

³⁹ According to de la Torre et al. (2006), macroeconomic variables explain the adjusted SELIC rate with an $R^2=0.86$.

and macro elements of Brazil's interest rate spreads. Estimating the pure spread along the lines of Saunders and Schumacher (2000), they conclude that macroeconomic variables are most relevant in explaining the behavior of interest spreads in Brazil up to 2001.⁴⁰ In a more recent and related paper, da Silva, Oreiro, and de Paula (2006) analyze the macroeconomic determinants of spreads in Brazil in 1994-2005. Using a VAR model, they find evidence that interest rate levels and, to a lesser degree, the inflation rate are the main macroeconomic determinants of high bank spreads. They note that the actual net interest margin comprises two elements: the “pure” bank spread and the “impure” net interest margin explained by institutional and regulatory factors. The methodology assumes that actual spreads are composed of a “pure” spread adjusted upwards or downwards by implicit interest expense (exemption from bank charges for certain classes of customer), by the opportunity cost of holding reserves, and by capital requirements imposed by regulatory standards and bank supervision.

4.10 Other studies have looked at the determinants of interest rate spreads in cross-country analyses using variants of the pure spread methodology of Saunders and Schumacher (2000). The results vary widely and are difficult to compare because of differences in time periods and country coverage.⁴¹

Spreads Since 2006: the Micro Story

4.11 Since 2006, the global financial crisis and economic slowdown and Brazil's strong economic performance despite this uncertain external environment have provided a very different setting for assessing the role of the SELIC and its impact on spreads. A significant reduction in spreads accompanied an improved macro environment and lower SELIC: nevertheless, Brazil's spreads have remained fairly high. More recent analyses have in fact pointed to the central role of microeconomic factors in pushing up spreads.

4.12 The Central Bank of Brazil provides a regular decomposition of the interest rate spread into its component parts to shed light on the role played by microeconomic factors. Using data from banks' balance sheets, the average spread is broken down into the following factors: administrative expenses, direct and indirect taxes, costs associated with defaults, and banks' “net margin.” According to the most recent data for all banks in the *Relatório de Economia Bancária e Crédito*, between one-half and three-quarters of the spreads on fixed interest rate credits from 2002 to 2009 can be explained by the micro data captured in factors 2-5 in Table 4.1. Direct taxes raise spreads by another 10 to 20 percent, leaving a weaker role for the unexplained margin—that is, what's not explained by specific micro factors and thus left to macroeconomic risk and banking market structural factors.

⁴⁰ The pure rate has also been derived in single-country studies by Ho and Saunders (1981) and Angbazo (1997) for US banks and by McShane and Sharpe (1985) for Australian banks.

⁴¹ Notable studies include Demirguc-Kunt, Laeven and Levine (2003), Peria and Mody (2003), Brock and Rojas Suarez (2000), and Maudos and de Guevara (2004) based on an 85-country sample spanning 1999-2002, Gelos (2006) finds that intermediation spreads in Latin America are high by international standards.

Table 4. 1: Decomposition of Total Bank Spread (Private and Public Banks)

		Percentage of the spread							
		2002	2003	2004	2005	2006	2007	2008	2009
1	Spread Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.00
2	Administrative Cost	19.07	25.52	23.65	22.43	21.15	21.19	11.50	15.77
3	Default	29.07	34.48	28.79	33.12	35.70	33.54	31.23	32.16
4	Forced lending and cross subsidies	5.60	7.08	5.69	4.29	3.21	3.45	1.48	1.65
5	Fiscal Costs/Payments and Credit Guarantee Fund	4.77	4.66	4.67	4.53	3.70	3.85	3.71	3.77
	Indirect Taxes	3.30	3.05	3.31	3.11	2.99	3.09	3.19	3.15
	Costs of the Credit Guarantee Fund	1.47	1.61	1.36	1.42	0.71	0.77	0.52	0.62
6	Gross Margin, Errors and Omissions (1-2-3-4-5)	41.49	28.27	37.20	35.62	36.24	37.97	52.09	46.65
7	Direct Taxes	14.28	10.42	12.78	12.21	12.40	13.20	20.90	18.67
8	Net Margin, Errors and Omissions (6-7)	27.20	17.85	24.42	23.41	23.84	24.76	31.19	27.97

Source: BCB (2009), *Relatório de Economia Bancária e Crédito*. Note: the Credit Guarantee Fund is the Fundo Garantidor de Créditos.

4.13 **Examining the trends in component factors over the period, the higher net bank margin was driven more by higher direct taxes and less by administrative costs, forced lending, and cross-subsidies.** The rapid expansion of credit to the private sector in 2009 was largely financed directly by the Treasury through a grant to BNDES, with a further line of credit made available in 2010.⁴² As a result, these costs were not borne by banks and are not reflected in the direct lending and cross-subsidy component of spreads.

4.14 **Using micro-level evidence from the US, Saunders and Schumacher (2000) found that institutional and regulatory factors were relatively more important, accounting for about 60 percent of the US net interest margin in 1995.** With respect to credit contract enforcement, poor quality of actual credit contract enforcement through the judicial system appears to be a significant factor behind high spreads, resulting in higher costs that are passed on to borrowers. Relative to credit risk and the spread dispersion across lending products, these variations can be attributed to differences in default risks; in other words, firm characteristics imply differences in credit risk, which matter for access to loans (Souza, 2008).

4.15 **The Central Bank's most recent credit market data show a substantial increase in the volume of credit outstanding, highlighting the relevance of default risk to the analysis of both the structure and determinants of bank spreads in Brazil.** On one hand, excessive credit risk in lending activity restricts the availability of credit; on the other hand, it represses demand for credit by increasing the cost. The Central Bank (2004, 2006) finds that one of the main causes of high bank spreads in Brazil is the high level of default risk faced by banks in their credit portfolios.

⁴² BNDES accounted for about 20 percent of total credit in the economy in 2009.

Methodology and findings

4.16 **The studies already surveyed provide evidence supporting the impact of both macro and micro factors on spreads in Brazil, but moving from country-specific studies to an international perspective yields somewhat different results.** De la Torre et al. (2006) found that Brazil's high spread was mainly due to macro factors, but they posited that micro factors would become increasingly important if the SELIC were to decline. This hypothesis is borne out by the analysis, which considers Brazil's spreads in a cross-country context. Specifically, country-specific approach is extended by considering the various determinants of spreads in a multi-country analysis that distinguishes among macro determinants, micro determinants and market-structure explanatory factors.

4.17 **Following methodology pioneered by Ho and Saunders (1981), expanded by Saunders and Schumacher (2000), and used by Afanasieff, Lhacer and Nakane (2002), a two-stage regression analysis⁴³ is used to filter out the bank-specific institutional and regulatory determinants of spreads.** The procedure uses net interest margin (NIM) as a proxy for interest spreads, estimating internationally comparable measures for (i) institutional and regulatory (I&R, or micro) factors; (ii) macro factors; and (iii) banking-market competition factors.⁴⁴

4.18 **The methodology in the analysis adds value by making the analysis of spreads more consistent and comparable across banks and countries through the use of a very large database.** Using BankScope for 1995-2009, individual bank data was collected on the net interest margin, noninterest expenses, other operating income over average assets, total assets, noninterest earning assets, and total capital ratio. The database totaled 231,834 bank observations across 197 countries and areas, covering 16,434 banks worldwide (the number of observations varies by year). Consistently collected by BankScope, these data are comparable between banks, countries, and regions. The data were used to calculate the four variables for the regression: the net interest margin (i.e., the difference between a bank's interest earnings and expenses as a percentage of interest earning assets); the implicit interest payments (noninterest expenses minus other operating income)/total average assets; the cost of reserves (noninterest earning assets/total assets); and the extra capital held (total capital/total assets).⁴⁵

4.19 **Using this cross-country methodology on “pure spreads,” the regression analysis finds that micro factors are dominant in explaining Brazil's high spreads—a marked contrast to earlier studies.** In 2009, micro factors explained 79 percent of the spread, lack of competition accounted for 17 percent, with the remaining 4 percent explained by macro factors (see Table 4.2).⁴⁶ These findings represent a fundamental shift from previous studies. The importance of micro factors is consistent with the fact that few changes in the institutional and regulatory environment occurred during this period. But the lower R^2 in 1996 and, in particular, 2001-2002 indicate that macro factors had a relatively larger impact on spreads during these

⁴³ See background paper by Jorgensen and Apostolou (2011).

⁴⁴ Institutional and regulatory factors (I&R) are captured by interest rate restrictions on deposits, reserve requirements, and the capital-to-asset ratio; macro factors are captured by interest rate volatility; and market structure in terms of monopoly power is captured in the residual.

⁴⁵ Details on the methodology can be found in the background paper.

⁴⁶ The regression findings are robust, reflected by an R^2 of 0.76.

years. This should be expected, given the uncertain macro environment in 2001-2002. On the other hand, it is surprising that the economic crisis of 2008 is not reflected in the determinants of the NIM; on the contrary, the R^2 was higher in 2008 than most other years, suggesting that micro factors were the fundamental determinants. But the model may not be reflecting the entire impact of the financial sector, or it may not capture offsetting factors in this extreme case.

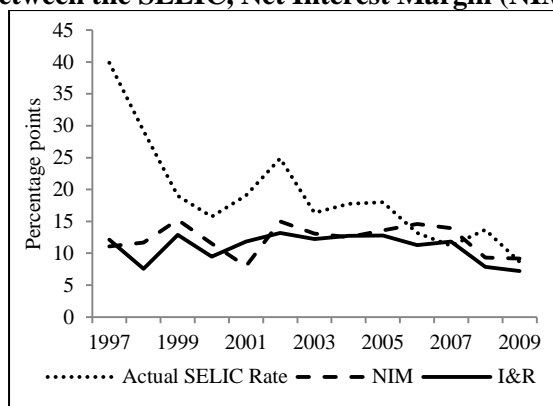
Table 4.2: Regression Results for NIM Spread

Year	Country Obs. Per Year	R ²	NIM	I&R	Macro
1995	99	0.83	15.80	16.91	-1.11
1996	111	0.37	13.12	9.50	3.62
1997	119	0.59	11.06	12.14	-1.08
1998	123	0.45	11.68	7.56	4.12
1999	119	0.49	15.25	12.86	2.39
2000	129	0.68	11.53	9.46	2.07
2001	154	0.06	7.96	11.83	-3.87
2002	162	0.30	15.01	13.17	1.84
2003	143	0.68	13.09	12.24	0.85
2004	137	0.83	12.53	12.71	-0.18
2005	140	0.79	13.58	12.79	0.80
2006	142	0.45	14.59	11.28	3.31
2007	153	0.58	13.96	11.83	2.13
2008	124	0.83	9.33	7.87	1.46
2009	106	0.76	9.14	7.21	1.94

Source: Jorgensen and Apostolou (2011).

4.20 **Despite the decline in the SELIC, the net interest margin remained high – in the 10-15 percent range – and largely explained by institutional and regulatory factors** (see Figure 4.2). In 2007 and 2009, however, the SELIC actually dipped below the NIM, meaning that banks’ returns were lower than they would have been by simply lending to the government, which in theory is risk free.

Figure 4.2: Link between the SELIC, Net Interest Margin (NIM) and I&R Factors



Source: Jorgensen and Apostolou (2011) based on BankScope data

4.21 **One possible explanation is that banks underestimated default risk, and realized default rates were higher than anticipated.** This implies that a risk-averse bank would choose to lend risk-free to the government and get higher returns. Another possibility is that banks

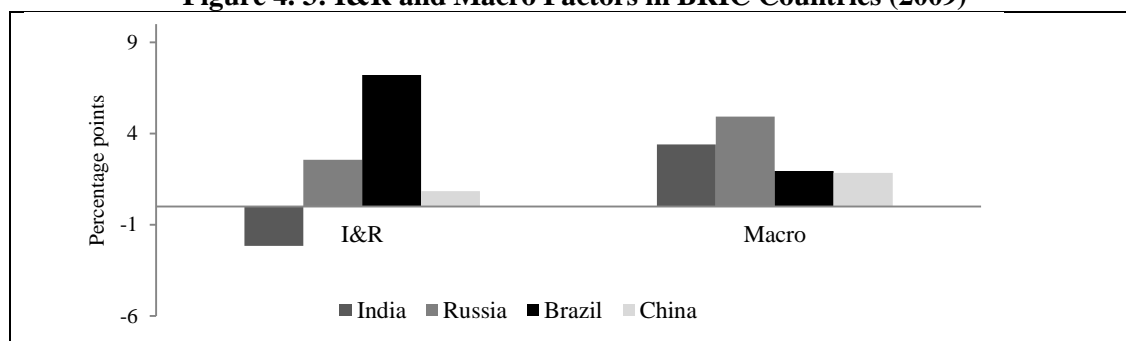
mistrust the government to repay its debts.⁴⁷ Still one more possibility exists: If one considers the profit equation utilized by Demirgüç-Kunt and Huizinga (1999), a SELIC rate higher than the NIM may be because Brazilian banks have negative non-interest income, high overhead costs, and high loan provisioning.

Conclusions and Policy Implications

4.22 The preceding analysis provides policy makers with information about the potential sources of high spreads; in the case of Brazil, it provides the basis for evaluating whether to address micro or macro constraints to facilitate credit access. The net interest margin estimate is a more accurate measure of bank spreads than the IFS definition, which effectively overestimated Brazil's intermediation costs relative to other countries. Even so, Brazil still ranked 15th highest among 121 countries in net interest margin, and 17th in terms of the degree to which micro factors push up bank spreads. By contrast, the ranking was 49th for Russia, 85th for China, 107th for the US, and 119th for India.⁴⁸ Spreads in Brazil are unlikely to come down significantly unless institutional and regulatory factors are addressed through deeper reform.

4.23 A key finding of the analysis is that micro factors were the main drivers of NIM spreads across the world, indicating that the profitability of banks is mainly determined by micro factors. The LAC region displays higher NIM spreads than all regions except Sub-Saharan Africa, pointing to a region-wide problem despite strong growth performance in recent years. Compared to the other BRIC countries, Brazil demonstrated consistently higher spreads due to micro factors, suggesting that Brazil faces a significant reform agenda to catch up (see Figure 4.3.) The breakdown of BRIC countries' contributing factors suggests significant capital outflows brought little change in banks' behavior on net interest margins and macro and micro factors during the 2008 crisis.

Figure 4. 3: I&R and Macro Factors in BRIC Countries (2009)



Source: Jorgensen and Apostolou (2011) estimates using BankScope data

4.24 The results of the regression analysis imply that there is scope to bring down the cost of financial intermediation in Brazil by addressing institutional and regulatory factors that are imposed on banks and passed on to borrowers through higher costs. These factors

⁴⁷ This seems unlikely because Brazilian government's debt ratings have improved significantly, and the debt to GDP ratio has declined.

⁴⁸ The LAC region has 12 countries ranked in the top 30 on net interest margins in 2009. Eleven LAC countries were in the top 30 on highest I&R factors, with Ecuador ranking third and Jamaica fourth, compared to Brazil's ranking at 17th. In terms of macro factors, LAC has six countries in the top 30, with spreads fourth highest in Costa Rica and seventh in Paraguay, compared to Brazil's ranking of 56th.

include the banking regulatory framework as well as institutional aspects such as creditors' rights and contract enforcement mechanisms. To a lesser but still significant extent, state intervention in the banking sector also contributes to the high cost of financial intermediation by distorting incentives to borrow and lend and limiting competition.

CHAPTER 5. ACCESS TO CREDIT⁴⁹

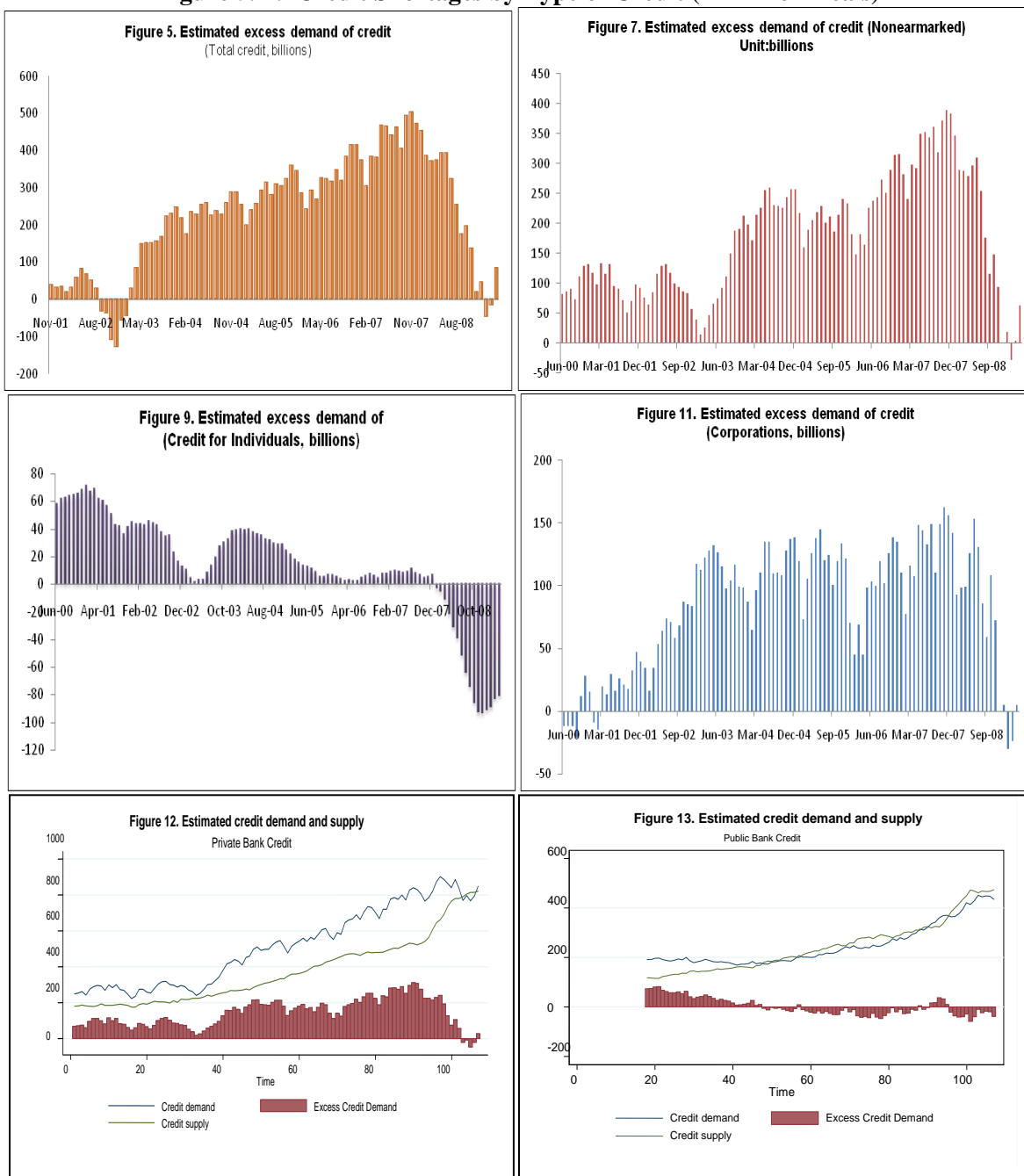
In this chapter, we examine the profiles of borrowers in Brazil and their credit terms. The first part of the chapter documents large shifts since 2005 which have expanded access to and demand for credit, particularly by consumers. The rationing model estimates demand and supply of different credit segment and shows that while pent-up and new demand by consumers was met, banks remained reluctant to lend to firms. Their borrowing costs continued to be high, although loan terms improved somewhat. The chapter then investigates the determinants of firms' access to credit and the impact of the 2008 financial crisis on household access to credit.

Access and Rationing

5.1 Credit rationing has long been a feature of Brazil's financial market, but credit shortages have apparently increased over time. Cunha and Sakho (2011) identify gaps between credit supplied and demanded in Brazil and find that demand increases have exceeded supply increases—on average. On the supply-side, the expansion of credit has followed a steady trend, driven by private and undirected credit over 2004-08 (a procyclical rise), then by public and directed credit thereafter (a countercyclical rise). Demand for credit has exhibited higher volatility, fluctuating more strongly with economic activity. This has led to procyclical credit shortages, which are relieved in times of crises (see Figure 5.1). These shortages were more pronounced for firms than for individuals. Credit shortages could arise from a variety of factors: temporary disequilibrium associated with shocks, long-term disequilibrium related to government constraints, or high pooled interest rate levels from asymmetric information between lenders and borrowers.

⁴⁹ This chapter is based on the following background papers: “Credit shortages in Brazil? A Disequilibrium Model Approach” by Cunha and Sakho (2010); “Coping with the Financial Crisis: Household Evidence from Brazil” by Robert Cull, Phillippe G. Leite and Kinnon Scott (2010); “Assessing Financing Constraints for SMEs in Brazil” by Stijn Claessens and Yaye Seynabou Sakho (2011); “Financial Instability and Credit Constraints : Evidence from the Cost of Bank Financing” by Bruno Martins (2010); and the note “Recent Developments in Access to Credit in Brazil” by Guilherme Lichand (2011).

Figure 5. 1: Credit Shortages by Type of Credit (in million Reais)



Source: Cunha-Sakho (2010)

5.2 Access to credit has been unlocked for consumers and households but this has not occurred to the same extent for firms. A large share of the credit expansion over the past decade was driven by increases in supply to individual and decreases in their lending interest rates. This divergence between individuals and firms has been even more pronounced since the financial crisis, with corporate credit growing less than consumer credit. The cyclical nature of credit demand differs between firms and individuals. Firms use credit mainly to finance working capital and new investments. These variables are procyclical, and they tend to fluctuate more

than output. For this reason, credit demand by firms is likely to vary with the level of economic activity. On the other hand, individuals use credit for consumption of durable and non-durable goods. Credit helps households to smooth consumption over time and across economic cycles. As consumption tends to be less volatile than GDP, it is possible that individual credit is countercyclical.

5.3 The supply of credit to individuals has increased significantly with the use of collateral to mitigate rationing due to perceived high individual risk. Although credit grew significantly in the decade's second half, excess demand also increased during this period. The volume of credit supplied grew continuously for most of the period. Despite the fiscal consolidation and a favorable macroeconomic environment, however, the expansion in credit supply was not enough to meet the increase in demand. For almost all market segments, credit shortages increased after 2004.

5.4 The demand side had two exceptions to this pattern: credit to individuals and credit from private banks. The supply of credit to individuals closely followed demand until 2007-08. At that time, a demand boom occurred, possibly associated with regulatory changes and financial innovations that fostered increases in observed credit and decreases in credit costs. Gaps between credit demand and supply to individuals are small, and they change from positive to negative during the period. No clear pattern emerges for credit to individuals and economic cycles. In the corporate sector, shortages are more severe, and they seem countercyclical, especially in the second part of the decade.

5.5 The previous chapter noted that interest rate spreads have declined, but they remain stubbornly high compared to other emerging markets. Recall from Figure 1.11 that lower SELIC rates have translated into lower lending rates for individuals. But the average spread for firms has increased since 2005.

5.6 The trends in aggregate credit, the roles of public and private banks in supplying credit, and household and firm capacity to access credit point to a question. The recent expansion of credit benefited consumers, who undertook more borrowing and on improving terms due to payroll loans and other new credit instruments. See Annex 2 for more details on consumer credit supply and demand. But firms did not receive a comparable dividend; on the contrary, they continued to face constrained access and high spreads, despite a decline in banks' cost of funds. The 2008 crisis is a case in point on the impact of the crisis on household access to credit.

Firm Access to Credit

5.7 The determinants of credit demand are very different for consumers and firms, and these gaps shape the evolution of access to credit in each category. Regression analysis finds evidence that firms use credit mainly to raise working capital and finance new investments. These variables are procyclical, and they tend to fluctuate more than output. For this reason, firms' credit demand should vary with the level of economic activity. By contrast, consumer credit demand tends to be countercyclical or acyclical given its consumption-smoothing function. Another difference is that firms tend to have a larger number of financing alternatives. In addition to retained earnings, supplier credit, and bank credit, firms can finance activities through

equity or bond markets. In contrast, individuals are restricted to saving and bank credit as formal financing options, although the use of credit cards has grown in recent years.

5.8 In this section a rich set of firm and bank data is used to investigate the determinants of firms' demand for and banks' supply of credit, combining the 2003 and 2008 ICA enterprise surveys for Brazil with monthly loan data from the Central Bank's privately held credit registry.⁵⁰ We examine how they have evolved over time and identify the main determinants of securing new loans. We conclude the section with an analysis of why consumers' access to credit increased while firms' access did not.

A Matter of Definition: Access versus Use of Financial Services

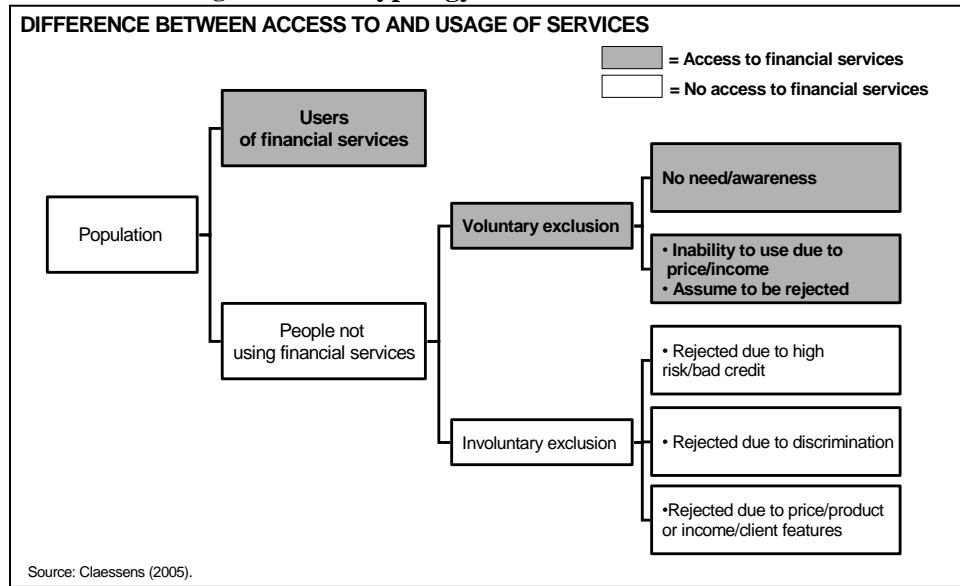
5.9 The issue of financing constraints is of special relevance for Brazil because some classes of borrowers face very high interest rates, which some analysts consider a constraint on growth.⁵¹ Chapter 4 identified various difficulties in determining the driving factors behind high interest rates and spreads. Are they compensation for borrowers' risks and other weaknesses on the demand side? Or are they due to supply constraints at the level of individual financial institutions (e.g., lack of competition among banks)? Or inefficiencies in financial intermediation (e.g., lack of credit information, financial taxation, etc.)? Or the weak contracting environment in light of judicial inefficiencies? Or other factors? Over the past decade, many of these factors have improved; nevertheless, financing constraints remain a preoccupation for firms in Brazil.

5.10 Assessing whether Brazilian firms are credit constrained requires differentiating between access to external financing and its use, a distinction that requires considering both demand and supply factors. Access is the availability of financial services at a "reasonable cost," whereas use is the actual consumption of financial services. Some firms may not want to borrow even when they have access, relying instead on internal financing (voluntarily excluded). Or they may exclude themselves by not requesting access because they believe they will be rejected. Some firms may want to borrow and would in principle be able to do so, but they may lack access, for example, when there is no banking outlet nearby (involuntarily excluded). Some firms may in fact be discriminated against. Financial institutions may not want to lend to some firms because of creditworthiness concerns (credit rationing). For example, many financial institutions avoid lending to small firms because of the high risk and transaction costs, combined with difficulties in contract design and enforcement. And many banks find it too costly to cater to firms in remote areas; this does not reflect a market failure but rather that finance, like other services, has its own supply forces. Figure 5.6 provides an illustration of the various types of access.

⁵⁰ This section is based on the background paper Claessens and Sakho (2011).

⁵¹ Hausman, Rodrik, and Velasco (2005) argue that the Brazilian economy does not lack profitable investment opportunities but the high opportunity cost of capital means few new investments are profitable enough to overcome this hurdle.

Figure 5. 2: A Typology of Credit Access and Use



Methodology and Data

5.11 **Given the wide range of potential explanations of firms’ borrowing behavior, it is essential to establish the nature of the financing constraints they face.** But methodological and data issues make this task difficult.

5.12 **First, endogeneity has plagued the empirical research on credit demand and supply.** Simultaneity is an important form of endogeneity that arises in estimating supply and demand equations, and it is usually addressed by applying the instrumental variables method. And with firm surveys on access to finance, one cannot avoid problems of endogeneity and ambiguity in the definition of access.⁵²

5.13 **Second, defining or measuring access to finance is not an easy task.** Generally, access to finance refers to the availability of supply of quality financial services at reasonable costs, with a focus on whether investment is constrained. But this requires one to define “quality” and “reasonable.” Access to finance is also influenced by the definition and priority of its various dimensions, such as reliability, convenience, continuity, and flexibility, each of which requires a

⁵² For example, dependent and independent variables in empirical analyses using data from survey responses often share a common parameter that is omitted in the survey and is usually the result of self-selection in survey participation. But these can suffer from biases. Specifically, better firms may not complain about their access to finance while worse firms, e.g., firms with weak growth opportunities and poor collateral, are likely to complain the most about lack of financing. As a consequence, complaints about access to finance cannot be used directly as independent variables to predict firms’ performance as a dependent variable. Financial and other data may also be biased or endogenous to external financing constraints. The interest rate a firm pays and the amount of financing it receives, for example, are not useful control measures because they depend on firms’ creditworthiness and degree of access. In addition, the cross-sectional nature of most surveys does not allow the tackling of any simultaneity bias between survey responses that are used as dependent and independent variables. Furthermore, at times the perception of firms has been used as indicators of the business environment itself, which introduces another source of endogeneity (e.g., with many firms complaining, the business environment may be considered poor, but then it may also be that firms are weak themselves and thus complain more).

different measure. A related issue is that firms obtain various forms of external financing—short-term trade finance, working capital financing, and investment financing. Each may have a different degree of financing constraints; e.g., a firm may not be constrained in trade finance but may not be able to access investment financing.

5.14 Third, a major problem with measuring and evaluating firms’ access to finance is the absence of a unified conceptual framework for data collection. Data are often collected on an ad-hoc basis, with varying definitions over time. They are not comparable across countries and do not necessarily yield appropriate variables for model testing. The data are rarely in experimental form that controls for firm characteristics by randomizing treatment, which could address selection bias.⁵³ When adequately detailed datasets are available, however, demand- and supply-side factors can be matched at the firm level.

5.15 In the analysis that follows, these issues are circumvented using a rich dataset on firms and bank information over many years, along with a Bayesian estimation of a disequilibrium model of the credit market, to separately estimate credit demand and supply functions. The Bayesian estimation method allows us to robustly solve the issues of endogeneity and simultaneity.⁵⁴ This approach uses the data augmentation principle to estimate the latent variables—credit demand and supply of the disequilibrium model—through the Markov Chain Monte Carlo (MCMC) method. One advantage of this technique is that it provides the whole distribution of the parameters and latent variables (the posterior distribution). While this approach is computationally intensive, it allows us to circumvent some of the shortcomings encountered in the Maximum Likelihood approach (i.e., numerical optimization problems).

5.16 Banks lend at interest rates that vary according to borrowers’ characteristics; interest rates are affected by this clientele effect. Banks that cater to SMEs, for example, lend at higher ex-ante rates because transactions costs and risks of non-recovery are higher. The rate will also be part of a broader set of terms, including loan amount, collateral required, and loan maturity. Bank characteristics can play a role in financing as well. For example, one may expect the likelihood of granting loans to firms will be higher at banks that are more profitable, that intermediate more in general, and that are sounder. We therefore use different firm and bank characteristics as control variables (see Claessens and Sakho, 2011 for detail on methodology).

Sources of Firm Financing

5.17 This section presents recent trends in firms’ financing sources. Our initial 2003 sample includes 1,682 firms—20 percent of which are micro (1 to 19 employees), 52 percent are small (20 to 99 employees), 23 percent are medium (100 to 499 employees), and 5 percent are large (above 500 employees).⁵⁵ We use credit-registry data to follow those firms from 2003 to 2009 on a monthly basis to characterize their relationship with the banking sector. In 2008, re-about 500 of these firms were resurveyed using the 2008 ICA questionnaire. In the base year of

⁵³ Duflo, Glennester and Kremer (2007) provide a practical guide to build in randomization as part of research design in the field.

⁵⁴ Bayesian estimation was originally proposed by Bauweans and Lubrano (2006).

⁵⁵ The size classification of firms by number of employees is defined by the Ministry of Industrial Development and External Trade.

2003, 34 percent of firms had a bank loan, 26 percent did not apply for a bank loan, and 7 percent reported that their loan requests had been rejected.

Firms' perception of financing constraints

5.18 **In the 2003 ICA survey, high interest rates are the principal reason cited for not applying for loans by firms of all sizes.** The cost of finance is given as the main obstacle to growth for 57 percent of firms. Application procedures and collateral requirements come next in the ranking of obstacles, affecting especially micro and small firms. The next four obstacles in descending order are tax rates, corruption, economic and regulatory policy uncertainty, and macroeconomic instability. Access to finance (and specifically collateral) rank seventh, cited by 34 percent of surveyed firms as an obstacle to growth. However, the ranking varies by firm size: access to finance and cost of credit are less binding obstacles for large firms. Large firms are more likely to cite tax rates and corruption as their main constraints to growth.

5.19 **Most firms in the 2003 sample are small (73 percent) or medium (23 percent) in size, and most operate in the garment industry.** Most large firms, by contrast, operate in the processed-food business. As expected, the larger the firm, the more it sells abroad. Larger firms tend to be older and by definition employ more people, and they have greater access to private and foreign sources of financing. Smaller firms rely on private and domestic sources of finance. Not surprisingly, larger firms have higher equity and liability levels. These trends are similar in 2008, except for the fact that most small firms operate in the furniture industry, median firms in the machinery business, and large firms in auto parts.

5.20 **Firms indicate that the major financing constraint is being denied a loan.** The most important reason for limited access to bank loans is “lack of collateral” (38 percent), followed by “poor credit history” (26 percent). Among firms that perceive themselves as financially constrained, the majority are small (82 percent), and the problem of lack of collateral is even more binding. For medium and large firms, however, the most important financial constraint is “poor credit history.” The sectors most affected by financing constraints are garments (34 percent) and furniture (32 percent), in all sectors “lack of collateral” was reported as the main constraint.

Credit sources

5.21 **Firms need funds to finance both working capital and new investments; the former comes mostly from external sources, while the latter comes from internal sources.** This distinction may be due to the fact that banks perceive new investments as riskier than working capital (cash, inventories, etc). Money is fungible, however; some reallocation is expected to take place. For both working capital and new investments, most of the external financing comes from commercial banks, although the sources for new investments are more diverse and include trade credits and investment funds.

Loan characteristics

5.22 **We consider five loan categories: vendor loans, working capital loans, overdrafts, goods acquisition loans, and discountables.** They differ significantly by maturity, interest rates, collateral, firms' outstanding debt, and loan value. For example, goods acquisition loans have significantly longer maturities (averaging about 25 months) than other categories (averages ranging two to five months). Collateral is most often used for goods acquisition and overdraft loan categories. Firms that borrow for goods acquisition tend to be those with highest outstanding debts. The largest loans are issued through working capital and overdrafts.

5.23 **Lending rates vary widely among banks, even for similar products.** Looking at real interest rates, the minimum among all categories is approximately 14 percent. The standard deviations and maximum rates capture the variation. Overdrafts register the highest variability according to both indicators, with interest rates ranging between 34 percent and 167 percent. Rates are more stable for other types of loans. In decreasing order of interest rate volatility as measured by the standard deviation, these are: working capital, vendor, discountable, and goods acquisition loans (G&A).

5.24 **Turning to the loan-type distribution, most loans are in the form of discountables (82 percent), followed by working capital (8 percent).** The mean loan value for these two loan types is markedly different—R\$32,000 for discountables and R\$190,000 for working capital. The gap indicates that banks grant many small loans in the form of discountables, but larger loans are concentrated in a few working capital operations. Higher real interest rates are charged on overdraft loans (43 percent), sharply contrasting with rates charged for vendor loans (2 percent). This pattern also applies to the mean number of collaterals associated with the loan: vendor loans use the lowest level of collateral, while overdrafts and goods acquisition loans have higher associated collateral.

5.25 **In terms of volume, working capital is the most important loan category, followed by discountables.** The data show the steady increase of credit until the crisis in 2008; all categories but goods acquisition declined sharply in 2008 and 2009. Disaggregating these amounts of lending by firm size, most of the variation over time comes from the medium-sized firms' borrowing activity. For example, the amounts lent to small and large firms for working capital loans remains fairly stable at relatively low levels for the period analyzed, but the trend for medium-sized firms is more volatile and reveals higher total amounts of borrowing. This is consistent with the fact that mid-sized firms attract relatively more bank financing. This could also indicate that banks would wait for the firm to grow to a certain size and demonstrate its viability before lending significant amounts. Large firms may have access to other sources of funding.

Bank clientele effects

5.26 **The data suggest that small banks lend mostly to small and medium firms and to food processing, garments, and furniture industries** (see Table 5.4). Larger banks are even more likely to lend to small firms and to the same industries. This may indicate that larger banks

have better monitoring capacity. More profitable, stable, and liquid banks⁵⁶ lend mostly to medium-sized firms and to the food processing, textile, and garment industries.

Table 5. 1: Bank Lending Relationship by Bank Type, Firm Size and Industry

Loans granted by firm size	Small Banks			Large Banks			Profitable Banks			Stable Banks			Liquid Banks		
	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.
Small	29,915	41.7	41.7	6,786	62.7	62.7	963	38.2	38.2	7,661	37.9	37.9	7,778	38.4	38.4
Medium	32,274	45.0	86.7	3,151	29.1	91.8	1,352	53.7	91.9	10,346	51.1	89.0	10,259	50.6	89.0
Large	9504	13.3	100.0	884	8.2	100.0	204	8.1	100.0	2236	11.1	100.0	2222	11.0	100.0
Total	71,693	100		10,821	100		2,519	100		20,243	100		20,259	100	

Loans granted by firm industry	Small Banks			Large Banks			Profitable Banks			Stable Banks			Liquid Banks		
	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.
Food processing	13,267	18.5	18.5	1,512	14.0	14.0	524	20.8	20.8	4,727	23.4	23.4	4,769	23.5	23.5
Textiles	8,349	11.7	30.2	673	6.2	20.2	405	16.1	36.9	2,970	14.7	38.0	3,526	17.4	40.9
Garments	8,340	11.6	41.8	1,543	14.3	34.5	319	12.7	49.5	2,493	12.3	50.3	2,938	14.5	55.5
Shoes and leather products	4,026	5.6	47.4	1,325	12.2	46.7	157	6.2	55.8	1,471	7.3	57.6	1,587	7.8	63.3
Chemicals	6,791	9.5	56.9	664	6.1	52.8	230	9.1	64.9	1,366	6.8	64.4	1,252	6.2	69.5
Machinery	7,440	10.4	67.3	1,272	11.8	64.6	182	7.2	72.1	2,401	11.9	76.2	1,924	9.5	79.0
Electronics	9,514	13.3	80.5	1,252	11.6	76.2	339	13.5	85.6	1,368	6.8	83.0	1,117	5.5	84.5
Auto-parts	3,617	5.1	85.6	863	8.0	84.1	68	2.7	88.3	1,125	5.6	88.5	856	4.2	88.7
Furniture	10,349	14.4	100.0	1,717	15.9	100.0	295	11.7	100.0	2,322	11.5	100.0	2,290	11.3	100.0
Total	71693	100		10821	100		2519	100		20243	100		20259	100	

Source: Based on Authors calculations

Modeling the Determinants of Firms' Credit Demand and Banks' Credit Supply

Determinants of loan demand

5.27 While surveys capture firms' perceptions of financing constraints, they are plagued by endogeneity because the real reasons behind the reported obstacles are unknown. It may be that the firm has good growth opportunities, but banks are not interested in lending to firms in general. Or it may be that the banks make the right judgment in not lending to a firm that has limited growth opportunities or is not creditworthy. We use the data to formally assess the determinants of firm demand as well as bank supply as a function of the cost of financing and various macro and micro variables, including the SELIC. For each issue, OLS estimates are first described though they are known to be biased due to endogeneity and simultaneity, and then the robust disequilibrium estimation results is presented. Regression results are reported in Annex 1.

5.28 Under the OLS regressions for the determinants of loan demand, the lending rate is significant and has the expected negative sign in most estimations. The exceptions are working capital and vendor loans. However, the lending-rate coefficients in the working capital estimations are not significant, indicating some lack of sensitivity of loan demand to interest rates, which is consistent with the Chapter 2 conclusion of monetary policy's weak impact of on loan demand. On the other hand, this could be a sign of extreme rationing. The results indicate that loan maturity has a positive and significant effect on loan demand, and firms that can provide collateral have a higher demand for credit. Macro variables, such as inflation and GDP

⁵⁶ Liquid banks are defined as banks with the Bael index of net profit over net capital less <15.15; and immobilization index < 2.259)

growth rates, do not seem to have a significant effect on loan demand. With respect to firms' characteristics, large firms have a higher demand for goods acquisition, overdraft, and working capital loans, and a lower demand for other categories. Exporting firms have a significantly higher demand for discountable, vendor, and working capital loans. Moreover, we find that firms that are publicly listed have a higher demand for all types of credit. The same is true for owner-managed firms, with the exception of vendor loans. Finally, the availability of internal funding sources has an important negative effect on the demand for working capital and discountable loans. This indicates that some firms might voluntarily exclude themselves from bank credit or reduce their demand of credit, which has negative implications for the firms' long-term growth.

5.29 In contrast to the biased OLS results, the disequilibrium estimation method finds that the lending rate is not a significant variable in most estimations. This result has implications for the efficiency of monetary policy, adverse selection, and moral hazard. It also provides some indication of why spreads did not go down for firms. If demand does not react to the price of credit at least in the short term, then banks can keep charging high spreads while firms incorporate a higher element of risk in their operations. This also implies firms that borrow are more likely to be either more willing to take risks or already successful enough to afford it. Firms not in these categories resort to internal funding or other sources of financing. The results are consistent over time when comparing 2003-06 with 2007-09.

5.30 Loan maturity has a positive and significant impact on the demand for discountable, overdraft, and working capital loans. Furthermore, the availability of collateral is a significant variable in all estimations. In particular, firms that can provide collateral exhibit a higher demand for overdraft, vendor, and working capital loans and a lower demand for discountable and goods acquisition loans. Firm size does not seem to affect the demand for discountables and overdraft loans. However, smaller firms have a preference for working capital loans rather than vendor or goods acquisition loans. Whether a firm exports has a significant and negative effect on the demand for discountable loans. Finally, access to BNDES loans has an important and negative effect on the demand for overdraft and goods acquisition loans.

Determinants of banks' supply of credit

5.31 The OLS regressions find that credit history matters when banks issue loans, The level of firms' outstanding debt to one bank before a new loan contract is signed has a significant and positive impact on the supply of credit in all the estimations. Firm size and exporting status also matter. The supply of working capital, goods acquisition and overdraft loans is higher for large firms. The opposite is true for discountables and vendor loans. There is a larger supply of credit for exporting firms. Bank size also matters: Large banks have a lower supply of working capital, overdraft, vendor, and goods acquisition loans, and a higher supply of discountable loans.

5.32 The disequilibrium model estimation finds that the interest rate a bank can charge affects its supply of credit (i.e., loan offers). Banks' real lending interest rates have a positive and significant effect on the supply of overdraft, goods acquisition and vendor loans; they not significant for discountable and working capital loans. We find that the supply of discountable and working capital loans increases for firms that can provide collateral. The availability of collateral is not a significant factor affecting the supply of other types of loans.

New loan access

5.33 What are the key factors for obtaining new loans for firms that did not borrow in the recent past? In this analysis, a Cox equation estimation is used to consider new borrowers; i.e., firms that did not have access to loans for a given period in the past.⁵⁷ The results suggest that the lending rate matters, as do firm size and GDP growth. For each type of loan, the lending rate is not a significant factor affecting the probability of a firm getting a loan. However, when all loans are aggregated in the estimation, the lending rate becomes significant and has the negative sign that would be expected. This also happens with the firm size and GDP growth variables: They are significant in the estimation for all loans but not for each type of loan independently. When aggregating all loans, the results indicate that large firms have a lower probability of getting a loan if they did not borrow in t periods preceding the loan application, consistent with the fact that larger firms tend to rely more on internal sources of financing. Furthermore, higher GDP growth rates increase the probability of getting a loan.

5.34 An important factor affecting a firm's probability of obtaining a loan is the total number of loans that the firm had in the past. This variable has a positive sign and is significant in all the estimations. In other words, the past matters. This result may reflect the importance of a credit history in securing a new loan. The impact of loan maturity is also negative and significant in most estimations.

5.35 Both loan and firm characteristics matter for new loans. The results suggest that the variables that matter most for access to bank credit are loan characteristics such as real bank interest rates and loan maturity, firm characteristics such as size, macroeconomic conditions such as GDP growth, inflation, and BNDES share in credit, and previous access to credit (number of loans per firm).

Changing coefficients over time

5.36 The evidence points to improving access to credit for small firms over the past decade. Some characteristics' relative importance is fading. While firm size mattered in 2003-2006, for example, it is not as important in the sample for 2007-09. We also observe an increased role for BNDES financing, but with a negative coefficient, implying that publicly directed credit crowded out private credit for all loan types except overdraft and goods acquisition loans. The impact of cyclical downturns appears to be mitigated, signaled by the decreased significance of GDP growth. This result is consistent with the relatively small observed impact of the global crisis on credit access in 2009. During the economic slowdown, directed credit growth through BNDES helped maintain credit market liquidity for certain borrowers (discussed below).

Impact of the Crisis on Small Firms

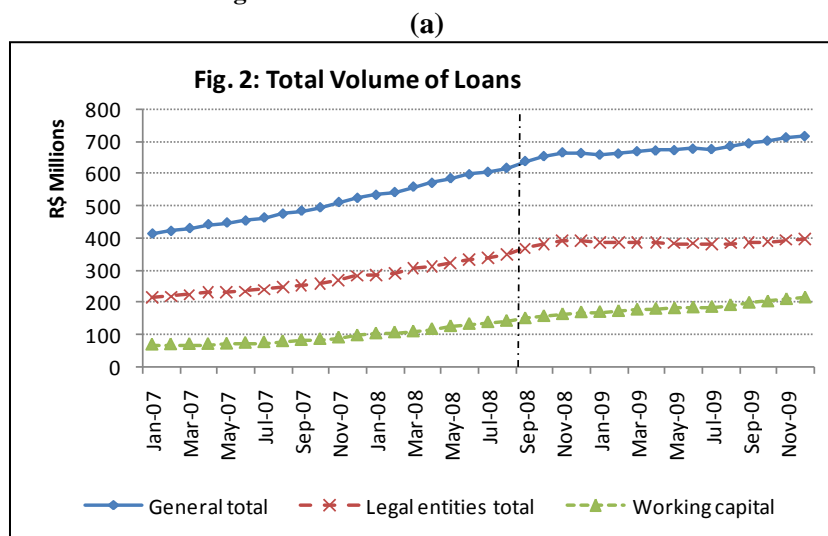
5.37 In this section, we consider how the financial crisis explicitly affected small firms' access to credit. The database of firm and bank information used in the preceding analysis to

⁵⁷ Table A.1.4 in Annex 1 presents results of the Cox equation estimation, which show the probability that a firm receives a loan given that the firm has not had a loan in the past t periods. The regression coefficients indicate how a change in one explanatory variable changes the probability of obtaining a loan given that the firm has not gotten a loan for t periods, where t is defined as the date in which a new loan is originated minus the last date the firm contracted a loan.

jointly assess credit supply and demand can be used to examine firms' borrowing behavior during the global financial crisis of 2008. We focus on the supply of loans using information from the Central Bank credit registry data on all loans to small firms.

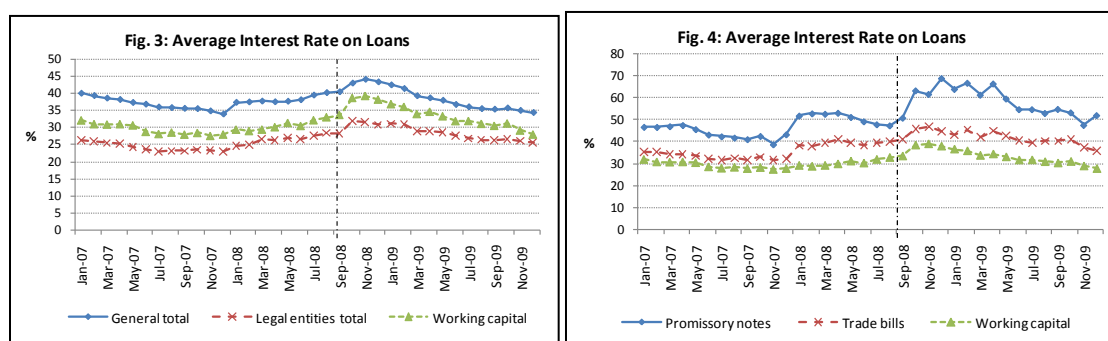
5.38 The crisis had little impact on the volume of bank credit in Brazil—but the cost of credit increased sharply. The average cost of bank financing rose slightly in the months before September 2008, but interest rates jumped in the six months following the outbreak of the crisis (see Figure 5.3), returning to pre-crisis levels in the second half of 2009. Despite the strong economic expansion in the pre-crisis period, the quick rise in the cost of bank credit in late 2008, partly explained by the expected increase in default rates, also reflected an increase of risk aversion in the financial market. This deep and sudden change in the cost of credit raises the question of how the burden was distributed among firms.

Figure 5.3: Total Volume of Loans



(b)

(c)



Source: Authors' Calculations

5.39 We examine the relationship between the degree of firms' financial constraint and the change in the cost of bank financing during the crisis. Financial constraint is measured by the effective cost of bank financing—the lending rate paid by each firm—during “normal times.” Using micro data on bank credit transactions, the focus is on firms that received credit for working capital before the crisis and during the crisis, totaling 59,130 firms and 83 banks. A

firm's decision to finance working capital with a bank loan in a given period might depend on its ability to tap other sources of funding, its own business cycle, and the changing financial needs in its investment projections. On average, all firms that received credit in the pre-crisis period had a smaller volume of credit and paid higher interest rates than those that obtained credit in both periods. This may indicate that the credit supply shock was more severe for smaller and more financially constrained firms. However, several factors may be correlated with the absence of credit transactions during the height of the crisis, such as increased risk aversion and dried up liquidity. For firms with credit transactions in both periods, the average interest rate rose from 46.9 percent pre-crisis to 53.3 percent post-crisis, equivalent to a 13.5 percent rise in the cost of bank financing. Table 5.2 shows the distribution of average interest rates across different credit risk ratings. Firms with the worst risk rating faced the largest increases in interest rates.

Table 5. 2: Interest Rates by Credit Rating

Worst Credit Rating	# of firms	Average Interest Rate Pre-crisis	# of firms	Average Interest Rate After-crisis	Var. % Interest Rate
AA	6,802	42.20 (15.56)	5,941	53.64 (17.92)	27.11%
A	24,677	46.92 (17.69)	24,171	52.89 (17.64)	12.72%
B	10,409	47.52 (32.60)	10,881	48.19 (22.47)	1.41%
C	14,639	49.26 (18.41)	15,210	58.09 (18.29)	17.93%
D-H	2,603	41.70 (16.64)	2,927	48.73 (16.07)	16.86%

Note: Standard errors in parentheses.

5.40 Is there a correlation between the degrees of firms' financial constraint and the observed rise in the lending rates during periods of high financial instability? The base for measuring credit constraint is the cost of bank financing in "normal times," given by the minimum and average interest rates on working capital loans between January 2006 and May 2008. Our model is estimated using a pooled cross-section, where the dependent variable is the percentage change in the average interest rate charged for working capital loans for each firm between the three months before and three months after the outbreak of the financial crisis.

5.41 The regression results show that the rise in the cost of bank financing during the peak of the global financial crisis was even greater for constrained firms; i.e., those that already paid higher lending rates and borrowed less during "normal times". This effect is on the order of 1 percent (0.7 percent) on the percentage change in the interest rate paid during the crisis for each positive percentage point change in the minimum (average) interest rate paid in "normal times."

5.42 We find a positive correlation between firm size and the percentage change in the cost of credit during the crisis. For a 1 percent increase in total credit obtained between June and December 2008, the average interest rate was 18 percent higher. This implies that, on average, large firms suffered more credit restrictions during the global financial crisis because they borrowed more. We also find a positive correlation between the change in the cost of credit and the change in firms' credit risk, measured by the ratio of loan loss provisions to total loans. For a 1 percent increase in firms' credit risk, the cost of bank financing was around 1.16 percent higher. But no correlation is found between the level of credit risk and the change in the lending rate during the crisis. Furthermore, the correlation between the lending rate and loan maturities is negative; for a 1 percent increase in maturity, the lending rate was 0.81 percent lower.

5.43 A long relationship between borrower and lender can reduce information asymmetry problems, bringing benefits to borrowers. On the other hand, a longer relationship increases lenders' information advantage, enhancing the degree of monopoly power over borrowers. We find for a 1 percent increase in the relationship's length increases interest charges on the order of 20 percent. The positive correlation between the bank relationship's length and changes in the lending rate during the crisis indicates that the "hold up" effect dominates reductions in information asymmetry.

5.44 The evolution of credit demand and supply during the crisis highlights the importance of multiple lenders, collateral, and hold up. For each additional bank from which firms obtained loans before the crisis, the change in the financing cost was approximately 100 percent lower, indicating the importance for firms being able to choose the best financing option in times of crisis. A 1 percent increase in the proportion of loans from government-owned banks lowered the lending rate 4.6 percent, reflecting the government's intervention during the crisis. The lending rate is correlated with the existence of guarantees—and their expected liquidation value—in loan agreements. In addition, the lending rate's change was greater for non-collateralized loans, indicating that guarantees are more valuable during periods of high financial instability.

Impact of the Crisis on Households' Access to Credit

5.45 Our background paper (Cull Scott and Leite 2010) uses nationally representative household-level consumption data to examine credit patterns during the 2008-2009 economic crisis. The National Consumption Survey took place between July 2008 and June 2009, coinciding with the economic downturn. The dataset allows comparison of the use of financial services during the crisis with the July 2002-June 2003 period, adjusted for seasonality. Six measures of credit were considered: broad credit (any type of loan), formal loans, informal loans, formal savings, net savings, and insurance.

5.46 The analysis shows that the crisis coincided with a substantial reduction in households' use of financial services, and those reductions were steepest for credit and savings from formal providers. As noted in previous chapters, the Brazilian economy weathered the 2008-2009 global economic crises relatively unscathed, rebounding to a path of strong growth. The relatively weak links between developed country banks and the Brazilian financial system limited the direct effects from the financial crisis; however, the results of this analysis suggest that the indirect effects of a generalized drop in demand were substantial. For

example, the probability a respondent had a loan from a formal provider was 9.4 percentage points lower in the second quarter of 2009 than in 2002.

5.47 The household survey data allow us to disaggregate the results by income group to determine which groups of borrowers were most affected by the crisis. As expected, households in the poorest quartiles suffered disproportionately. The most dramatic and persistent declines were for formal loans to households in the bottom two income quartiles. For households in the third quartile—i.e., households in the 25th-50th percentiles in income—formal borrowing was 10 to 12 percentage points lower than in the same quarter of 2002. For those in the bottom quartile, the decline was even steeper—11 to 17 percentage points. For households in both quartiles, these significant declines persisted through June 2009. This pattern is consistent with the notion that the marginal households' net-worth reductions due to the crisis can result in a substantial reduction in borrowing from formal lenders. They are likely to be reluctant to lend in the wake of the crisis, and poorer borrowers that lack assets to serve as collateral appear to be especially unattractive candidates.

5.48 There were also significant reductions in the formal savings of households in the bottom two income quartiles. The percentage-point declines were smaller than for formal loans, and they were at or near their lowest (in absolute value) in the second quarter 2009. A similar pattern holds for the measure of broad credit, especially for households in the bottom income quartile. The use of informal loans shows no significant decline in 2008-09, except in the lowest income quartile, a result explained by the fact that higher income households do not typically rely on this type of funding.

5.49 For households in the top income quartile, credit use for almost all indicators did not decline—in fact, it increased for formal loans and savings during the third quarter 2008. The exception is insurance, where usage was 7 to 9 percentage points lower for households in the top quartile in the third quarter 2008 and second quarter 2009. For households in the second income quartile, all indicators except informal loans show a temporary drop, but those declines had all been erased by the second quarter 2009.

5.50 Sharp distinctions emerge in the decline in credit use in rural versus urban areas. Declines in formal loans and broad credit were much steeper in rural areas, suggesting the disruption in formal credit markets was much more severe in the countryside. Although the household survey data do not enable us to sort out demand and supply factors, the decline in rural credit was likely the result of banks' reduced willingness to lend to rural borrowers.

5.51 Recall from Figure 1.2 that total credit as a share of GDP did not decline as a result of the crisis. In fact, a substantial increase in lending on the part of public banks more than offset the slight declines in lending by foreign and private domestic banks, resulting in an increase in the overall credit ratio. On the other hand, the regression results indicate steep declines in credit use, especially credit from such formal providers as banks, for certain types of households. Unfortunately, the data do not allow us to test whether the decline in credit use was less severe for households that relied more heavily on public banks rather than private banks for credit. We

can, however, include several supply-side indicators as explanatory variables in the regressions to help isolate demand-side factors that affected financial use.⁵⁸

5.52 Public deposits per capita are negatively correlated with all the financial use indicators, except the positive net savings dummy variable. Private deposits per capita are positively linked to use of formal loans, formal savings, and insurance, and negatively linked to use of informal loans. We cannot comment on causality, but results are consistent with the tendency of public banks to focus more than private banks on under banked areas.

5.53 Regressions run on subsamples provide a sense of whether household financial-use patterns in areas with high levels of public bank participation differ from use in areas with high levels of private bank participation. It is interesting that reductions in financial use during the crisis were steeper for households in states with public bank deposits per capita above the full-sample median, and this was particularly evident for loans. Moreover, credit use contracted less in areas with relatively low public bank participation (i.e., below median public deposits per capita), despite much steeper reductions in formal savings in those areas. To the extent that formal savings are a good reflection of what is happening to incomes, one might expect reductions in credit to be steeper in areas with low public bank participation because many of those borrowers were finding it harder to signal that they were creditworthy.

5.54 Declines in measures of broad credit and formal loans are steeper and more persistent in areas where the level of private bank deposits per capita are below the sample median. This is especially so for use of formal loans. Declines in the formal savings indicator are about the same for areas with high or low private bank participation, while the reduction in informal borrowing appears to have been more persistent in areas with high levels of private-bank participation.

5.55 In one interpretation, these patterns suggests that areas where private banks were prevalent had sufficient credit available during the crisis, so loan use dropped substantially less than in other areas. In part, this could be because informal lending arrangements were functioning less well in those areas, and formal credit had to substitute. The pattern does not, however, appear to be driven by reductions in income in the respective areas because formal savings dropped by about the same amount regardless of the level of private-bank participation. However, it is not possible to rule out the possibility that private banks simply located themselves in areas likely to bounce back more quickly from systemic shocks. If so, the private banks were not primarily responsible for sustaining financial use rates during the crisis.

5.56 In sum, the regression analysis shows that:

- Households' use of credit during the crisis—especially formal credit—declined substantially, particularly among the poorer segments of the population;
- The increased provision of credit by public banks in response to the crisis may not have benefited consumers as much as hoped, given their financial usage fell more in states with higher public-bank deposits per capita;

⁵⁸ These indicators are: total credit per capita, the number of financial agencies per capita, public bank deposits per capita, and private bank deposits per capita. The deposits variables can also be used as proxies for the activities of public and private banks under the assumption that these institutions are more likely to lend to households located in areas where they collect more deposits.

- Credit use contracted less in areas with relatively low public-bank participation, despite much steeper reductions in income in those areas.

Conclusions and Policy Implications

5.57 Credit rationing has long been a feature of Brazil’s financial markets, but credit shortages appear to have increased over time, more so for firms than for individuals. These shortages could arise from a variety of factors: temporary disequilibrium associated with shocks, long-term disequilibrium related to government constraints, or high pooled interest rate levels from information asymmetry between lenders and borrowers.

5.58 Firms demand credit mainly to finance working capital and new investments. These variables are procyclical and tend to fluctuate more than output. For this reason, credit demand by firms is likely to vary with the level of economic activity. On the other hand, individuals’ credit demand tends to be countercyclical or not cyclical at all because credit is used to smooth consumption over time and across economic cycles.

5.59 Evidence from a variety of data sources provides a detailed picture of the evolution of credit for consumers and firms over the past decade. By examining the nature of credit sought by and actually extended to consumers, aggregate credit growth is driven by rising incomes linked to strong economic growth. Increased demand for credit was at least partly met by increased access to financial services (e.g., through expanding bank branches, remote banking, credit cards, and simplified accounts) as well as through a range of instruments (e.g., payroll loans and microfinance). New products—facilitated by the Central Bank to promote the expansion of non-earmarked credit—increased the supply of credit.

5.60 The expansion in payroll loans contributed strongly to the overall expansion of credit to consumers, mainly by providing collateral and reducing lending risk. But substitution effects cloud the extent of this contribution. For example, individuals accessing payroll credit probably already had access to credit, but substituted among credit lines. Payroll credit increased from 0 percent in 2003 to nearly 22 percent in 2009; during the same period, credit cards jumped from 13 percent to 19 percent and consumer credit dropped from around 30 percent to 12 percent. This implies that the observed credit growth is not completely attributable to the extension of credit to previously unbanked populations.

5.61 This example illustrates the methodological challenges of explaining the direction of causality—did higher credit drive growth or did credit follow growth? The answer is particularly salient for firms because of the potential contribution of industrial value-added to GDP growth. The distortions in Brazil’s banking sector, documented in previous chapters, are reflected in the size and persistence of interest rate spreads and other high borrowing costs. While marked improvement in financing costs has coincided with increased demand, borrowing costs remain high compared to other countries. And recent reductions in these costs benefited consumers more than firms. This report has attempted to untangle this puzzle, but the evidence points to a very complex story.

5.62 Evidence that firms are not very sensitive to interest rates provides some clues to why spreads for firms did not decline. The finding has implications in terms of the riskiness of lending. If the demand for credit does not react to the price of credit at least in the short term,

then banks can keep charging high spreads, but loan portfolios would be riskier. It is therefore not surprising that loan risk accounts for the largest component of average spreads (see Chapter 4). On the other hand, interest rates on loans with longer maturities did have a positive impact on demand, as did the availability of collateral. On the supply side, banks are more likely to lend when interest rates are higher and typically when collateral and credit history are available, pointing to the importance of information asymmetries.

5.63 We find evidence of improving access to credit for small firms over the past decade. Some characteristics' relative importance is fading. For example, firm size mattered in 2003-2006, but it does not appear to be as important in the 2007-2009 sample. We also observe an increased role for BNDES financing, implying that public directed credit crowded out private credit for all loan types except overdraft and goods acquisition. The impact of cyclical downturns appears to be mitigated, a fact signaled by the decreased significance of GDP growth.

5.64 During the crisis, households' use of credit—especially formal credit—declined substantially, particularly among the poorer segments of the population. The increased provision of credit by public banks in response to the crisis may not have benefited consumers as much as hoped, given that their financial use fell more in states with higher public-bank deposits per capita. Similarly, credit use contracted less in areas with relatively low public-bank participation, despite those areas' much steeper income declines.

5.65 In the business-lending segment, the crisis actually reduced credit access for already constrained firms by increasing the cost of credit disproportionately. And large firms, who tend to borrow more in all periods, were also penalized by relatively higher financing costs. Firms with a history of borrowing from a single institution fared worse during the crisis than firms with prior credit from multiple sources.

5.66 Looking to the future of consumer and firm credit, technology may provide new instruments for expanding access to financial services. Electronic money—i.e., the use of cell phone-based technology to provide financial services—is a promising avenue for future expansion of credit and, in particular, financial inclusion. Brazil has a very high cell-phone penetration. Traditional commercial banks are moving ahead with this technology, recognizing large profit opportunities.⁵⁹ Caixa Economica Federal, for instance, has already developed a mobile account, and Bradesco will launch a partnership with mobile network operators to offer low-value mobile accounts. These banks' large client bases may entail significant entry barriers for new entrants. The Ministry of Social Development plans to distribute government conditional cash transfers via mobile accounts in the future. The Central Bank has drafted regulations to license nonbank financial service providers, but further regulatory work is needed. Regulatory uncertainty to-date has prevented e-money from expanding very far, despite its huge potential. Box 5.1 details other reforms that the government is implementing

⁵⁹ This contrasts with other countries, where such services have been pioneered by nonfinancial institutions.

Box 5.1: What has been on the government's recent reform agenda?

Medida Provisoria MP 518 – The government approved Provisional Measure 518 modifying the functioning and regulation of consumer credit protection (*Cadastro positivo*). With this measure, credit authorities would be able to share consumers' credit history and information on their obligations, subject to authorization by the consumers. The Senate passed the provisional measure into a law. This represents a significant improvement in the regulations for consumer credit access. Although it may have an impact only in the medium or long run, the changes in regulation can have a positive impact on credit growth via lower spreads, based on international experience.

Decreto 7.487 – IOF – The decree modifies three procedures related to the collection of the tax on financial transactions (IOF): (i) Under the new rule, banks will only be allowed to charge the daily IOF up to a maximum of 365 days following the debtor's declaration of default on a credit operation. This change is likely to reduce the burden of debtors in default and should be an incentive for them to renegotiate their debts. Currently, the tax can be charged indefinitely, lowering the chances of the debtor paying off its debts. (ii) The second measure proposes to apply the IOF on transactions of fixed income securities, which had been exempted. (iii) Finally, the new rule simplifies the collection of the IOF on the mostly small and micro firms companies registered on the *Simples Nacional* (Simplified Taxation System).

Medida Provisoria MP 517 – The provisional measure calls for changes in tax treatment in the default process. The measure includes modifications to the negotiations for bringing a loan to default by financial institutions. For loans up to R\$30,000, payment of the IRPJ (*Imposto de Renda Pessoa Juridica* - firms income tax) and CSLL (*Contribucao Social sobre o Lucro Liquido* or social security contribution) which amount to 40 percent, should be deferred during renegotiation. Currently, banks must disburse the total amount of the tax at the beginning of the negotiation, which complicates negotiations and discourages agreement. The debt recovery index was 25.9 percent in 2010 and averaged 24.5 percent over the past five years, showing negligible improvement. Furthermore, MP 517 includes the following incentives for long-term credit: (i) income-tax relief on debenture and *titulos privados* issued to finance special projects on infrastructure and investment; (ii) incentives for expansion of liquidity on the secondary market of private equity (*titulos privados*); and (iii) more flexible rules regulating the *Fundos em Participacao em Infraestrutura*. These represent fundamental institutional changes to encourage the private sector to extend their participation in long-term financing.

5.67 Our analysis concludes that reducing information asymmetries between lenders and borrowers increases access to credit, reflected by the positive influence of collateral and credit history in the regressions. Two main implications can be drawn:

- The reason behind differences in access for consumers and firms may have been the decrease in the relative overall risk of lending to consumers. Providing loans to consumers using payroll loans has reduced information asymmetries and the costs of repossessing the guarantee—so banks did not perceive it as risky to lend to consumers. Moreover, the increase in income of the average consumer in Brazil provided banks with the best guarantee in the form of income.
- There is scope for reducing lending risk for firms to spur firms' demand for credit through better terms, thereby fostering private-sector growth. Positive credit bureaus may be very effective in reducing the costs of financial intermediation, possibly in the same way that payroll credit unlocked the consumer lending market. Recall that at present, Brazil has only negative credit bureaus. Positive signaling is essential to reducing interest rates and increasing lending by addressing information asymmetries. It would allow banks to enhance client screening, especially by identifying borrowers that pay back on time. With better information on creditworthiness, banks could offer an array of financial products correlated with different default probabilities. A draft bill was submitted for Presidential approval in December 2010 and passed in May 2011.

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ANNEX 1: TABLES FROM CHAPTER 4

**Table A1. 1: OLS Regression Results: Determinants of Firms' Demand for Bank Credit
by Type of Lending**

Whole Sample (2003-2009)	All Loans	Discountable	G&A	Overdraft	Vendor	Working Capital
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real
taxa_real	-1.989*** (0.107)	-0.880*** (0.0316)	0.434 (0.388)	-1.359*** (0.290)	0.616*** (0.217)	0.197 (0.506)
maturity	6.107*** (0.291)	1.516*** (0.218)	3.084*** (0.244)	-0.0906 (5.493)	2.257 (2.060)	2.299* (1.298)
has_collateral	117.8*** (12.33)	-8.513*** (3.126)	3.018 (14.34)	229.0*** (46.50)	-42.44 (68.45)	111.8** (55.26)
inflacao	6.451** (2.851)	-2.162*** (0.547)	6.976 (6.026)	1.242 (18.70)	4.115 (3.588)	-5.839 (15.71)
l_inflacao	-9.728*** (2.887)	1.595*** (0.553)	-4.852 (5.903)	-22.62 (18.85)	-3.559 (3.560)	-1.956 (16.14)
pibgrowth	-398.2*** (118.6)	-24.51 (22.40)	640.8*** (247.2)	-2,271*** (772.1)	263.4 (166.2)	-1,118* (669.2)
l_pibgrowth	330.1*** (113.2)	49.23** (21.29)	-686.7*** (238.8)	1,535** (724.2)	-198.9 (166.0)	1,249** (633.6)
big	55.96*** (5.517)	-32.03*** (1.287)	79.93*** (14.19)	1,323*** (72.39)	-9.030 (7.093)	206.9*** (34.37)
export	26.13*** (3.028)	15.43*** (0.595)	3.316 (6.893)	10.13 (18.82)	26.58*** (6.965)	46.04** (19.58)
young	32.29*** (5.083)	-5.134*** (1.153)	23.78** (10.77)	-30.07 (62.12)	-25.72* (14.48)	-9.413 (31.81)
num_loans_per_firm	-0.000254*** (3.58e-05)	-0.000108*** (6.27e-06)	0.000134 (0.000225)	-0.00372*** (0.00101)	0.000597* (0.000352)	-0.000483 (0.000763)
has_bndes_loan	10.38*** (3.073)	-16.46*** (0.618)	-19.78*** (6.932)	-45.36** (21.77)	16.74*** (5.522)	27.22* (16.17)
has_internal_funding	-20.29*** (4.566)	-1.859** (0.914)	21.05** (10.35)	78.63*** (30.01)	9.484 (9.069)	-96.65*** (21.76)
is_manager_educated	11.51** (4.892)	3.923*** (1.003)	8.641 (13.37)	45.55* (27.50)	19.59** (9.924)	40.32* (24.29)
is_public_listed	23.27*** (4.947)	45.13*** (0.955)	14.11 (16.57)	954.0*** (66.73)	151.2*** (11.76)	103.3 (64.18)
is_manager_owner	-2.072 (3.825)	2.449*** (0.799)	11.15 (8.711)	289.8*** (33.50)	-13.92 (9.236)	-29.68 (20.34)
has_collateral_x_selic	-1,045*** (131.1)	117.1*** (34.14)	-39.57 (147.1)	-2,407*** (482.7)	1,374* (808.8)	-599.4 (629.3)
Constant	63.36*** (7.646)	23.45*** (1.586)	-101.6*** (22.39)	129.2** (54.77)	-41.15*** (12.74)	80.39* (43.40)
Observations	59,408	41,755	1,107	1,867	2,040	3,933
R-squared	0.030	0.089	0.221	0.377	0.137	0.027

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A1. 2: Disequilibrium Model Results: Determinants of Firms' Demand for Bank Credit by Type of Lending

Dependent variable carteira_ativa_real	Discountables		Overdraft		Working Capital		G&A		Vendor	
Demand betas	Estimate	Std. Dev.	Estimate	Std. Dev.	Estimate	Std. Dev.	Estimate	Std. Dev.	Estimate	Std. Dev.
const	30.60***	24.44	559.31*	1704.96	-2684.11***	2150.75	-1061.69***	393.68	-892.20	859.33
taxa_real	1.04	1.18	2.22	23.79	36.06	42.53	0.86	14.50	-7.07	8.82
maturity	25.85***	8.90	729.26***	370.40	87.08***	25.54	5.70	13.40	-109.89	77.89
has_collateral	-488.69***	231.35	2266.35***	904.39	12192.33***	3513.26	-1490.73***	375.36	4435.03***	2184.78
small	-45.92	21.70	183.00	734.09	1195.53**	495.32	-652.68***	240.32	-980.07***	446.59
big	-50.41	42.53	-8105.76	5375.66	318.46	942.94	2663.31***	1595.91	-854.39***	552.52
export	-73.42***	21.75	-589.04	572.02	462.91	1322.71	-89.49	200.63	-272.80	249.72
young	73.03	49.98	-2713.14	2910.60	-527.96	1086.89	547.05	398.56	189.99	845.66
isgroup	12.10	41.80	-1447.64	1266.68	610.08	1249.14	706.42	587.65	-286.05*	164.81
has_bndes_loan	-21.96	15.28	-2615.91***	961.88	1113.36	973.92	-639.51*	325.72	297.66*	157.22
has_internal_funding	-33.85	25.92	2031.74*	1117.90	-544.84	471.80	-825.69*	528.55	495.96***	191.80
inflacao	3.58	1.77	-64.69	59.77	-48.76	72.35	66.37***	24.06	14.54	15.31
has_collateral_x_selic	-3534.67***	1124.34	115068.80***	37987.46	-1422.48	11036.35	-5434.65	4102.10	-24523.66	57555.82

Table A1. 3: OLS Regression Results: Determinants of Bank Supply of Credit to Firms by Type of Lending

Whole Sample (2003-2009)	All Loans	Discountable	G&A	Overdraft	Vendor	Working Capital
VARIABLES	(1) carteira_ativa_real	(2) carteira_ativa_real	(3) carteira_ativa_real	(4) carteira_ativa_real	(5) carteira_ativa_real	(6) carteira_ativa_real
taxa_real	-1.563*** (0.105)	-0.814*** (0.0299)	1.128*** (0.390)	-0.232 (0.268)	1.390*** (0.230)	0.679 (0.498)
maturity	6.275*** (0.285)	-0.411** (0.200)	2.243*** (0.240)	12.68** (5.430)	2.436 (1.981)	3.861*** (1.335)
has_collateral	3.729 (3.320)	-2.867*** (0.716)	-8.479 (5.952)	10.36 (21.58)	75.49*** (14.19)	45.68*** (16.93)
total_debt_without_loan_real	0.0148*** (0.000279)	0.0216*** (0.000222)	0.00576*** (0.000632)	0.247*** (0.00880)	0.00118*** (0.000346)	0.0165*** (0.00210)
bndesrepper	18.88 (473.6)	335.1*** (85.39)	-703.3 (892.7)	-570.8 (2,897)	1,523** (743.0)	-1,560 (2,732)
ruperc	-115.1 (272.8)	182.0*** (49.74)	1,219** (532.4)	-645.2 (1,605)	-848.5** (409.9)	2,266 (1,494)
habperc	3,349*** (727.8)	-145.7 (131.4)	-361.4 (1,489)	4,705 (4,376)	-2,753** (1,327)	6,944 (4,501)
inflacao	-2.267 (3.376)	0.702 (0.607)	7.512 (6.077)	-0.589 (19.50)	1.030 (4.520)	-12.94 (18.71)
l_inflacao	-0.113 (3.221)	-0.274 (0.577)	-3.354 (5.921)	-9.735 (18.56)	-0.261 (4.220)	1.617 (17.83)
pibgrowth	-334.2* (182.3)	43.53 (32.33)	1,120*** (351.4)	-1,165 (1,204)	5.460 (311.6)	-1,279 (1,045)
l_pibgrowth	399.3** (183.4)	-45.01 (32.52)	-1,042*** (355.6)	797.6 (1,200)	52.04 (311.0)	1,309 (1,048)
big	55.99*** (4.901)	-18.92*** (1.005)	54.00*** (12.03)	603.4*** (73.27)	-10.84 (6.708)	198.8*** (32.80)
export	-0.430 (2.972)	7.445*** (0.532)	-10.61* (6.209)	-36.23** (16.90)	27.63*** (5.820)	42.93** (19.33)
young	-72.38*** (5.131)	-2.300** (0.987)	-12.29 (11.65)	-47.76 (58.19)	-22.65 (14.36)	-143.4*** (35.04)
basilindex_x_selic	6.703** (2.872)	14.65*** (0.520)	-8.196* (4.396)	-8.676 (18.06)	-24.80*** (5.959)	-0.0231 (26.81)
leverage_x_selic	0.840 (1.083)	0.180 (0.205)	-13.56*** (1.442)	5.007 (4.674)	3.893 (4.155)	-2.282 (5.372)
imobilization_x_selic	0.612 (1.319)	-8.764*** (0.259)	1.173 (3.032)	16.16 (10.36)	14.02*** (2.541)	-9.097 (8.595)
leverage	-0.203* (0.109)	-0.00735 (0.0203)	0.926*** (0.173)	-0.416 (0.505)	-0.107 (0.353)	0.292 (0.597)
profitabilty	7.028** (2.820)	-1.277** (0.525)	36.50*** (5.706)	-4.656 (16.37)	-19.24* (10.31)	-0.784 (14.52)
size	16.58*** (3.949)	10.11*** (0.856)	-16.03* (9.389)	-21.67 (36.18)	-36.81*** (10.38)	-32.62* (19.15)
basilindex	-0.978*** (0.260)	-1.169*** (0.0461)	0.145 (0.394)	0.845 (1.594)	1.708*** (0.480)	-2.068 (1.915)
Constant	-107.7*** (39.63)	-24.91*** (7.220)	-152.6* (83.39)	-63.93 (243.0)	82.69 (81.50)	-417.2* (236.2)
Observations	59,408	41,755	1,107	1,867	2,040	3,933
R-squared	0.073	0.237	0.364	0.491	0.067	0.040

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A1. 4: Disequilibrium Model Results: Determinants of Bank Supply of Credit to Firms by Type of Lending

Dependent variable carteira_ativa_real	Discountables		Overdraft		Working Capital		G&A		Vendor	
	Estimate	Std. Dev.	Estimate	Std. Dev.	Estimate	Std. Dev.	Estimate	Std. Dev.	Estimate	Std. Dev.
Supply betas										
const	789.34***	553.94	-34680.64*	15046.01	38471.27***	18899.82	10336.71***	1275.05	-777.73	5642.59
taxa_real	0.49	1.24	29.57**	12.50	-4.28	17.08	24.41***	15.36	19.49***	5.52
maturity	-4.90	5.60	207.13	312.68	-25.25	90.48	-13.78	11.02	-87.77	80.56
has_collateral	46.94**	25.39	-327.32	1006.67	1040.12*	540.12	-127.30	278.66	732.39	543.46
leverage	1.22***	0.37	-74.11	48.77	92.42***	31.89	-24.85***	8.54	-5.18	12.91
profitability	12.06	19.33	1635.05***	463.04	760.87*	503.02	288.10	159.14	-259.58	354.05
size	-42.61	37.10	-4198.82***	1666.96	175.58	724.85	602.47**	326.28	-581.28***	300.87
basilindex	-1.71	2.58	142.54***	67.03	722.89***	210.93	16.49*	8.64	-6.85	24.70
imobilizationindex	-8.28***	3.43	173.90	151.81	93.18	101.58	68.30	40.44	9.81	15.36
perc_intermed	0.08	2.49	132.34*	95.23	22.64	82.47	-81.42	76.32	-180.45***	91.12
small	-23.65	28.83	-2553.52***	1333.05	-677.67	665.21	-193.52	268.03	-19.49	148.66
big	65.05***	27.11	-1111.93	1749.29	-4032.59	2457.38	-543.09***	325.52	-68.86	301.63
export	-74.26***	40.12	-822.80	695.07	-1795.79**	563.57	-1226.87***	218.35	190.96	299.14
young	-71.55	76.04	346.89	2652.22	4049.35	2512.14	656.95	371.64	-977.31	806.81
isgroup	15.74	53.75	3891.68***	1295.10	2194.16	1155.50	-265.79	387.32	-485.69***	162.93
bndesperc	1917.67	1258.03	17502.83	18358.52	-57821.71***	23973.67	21635.12	16197.19	8531.17	15327.70
ruperc	1834.12*	929.41	179856.00*	133132.59	-39511.62	46596.45	-71851.48***	13104.17	-19403.50	24889.09
habperc	7248.65	5773.11	696258.62***	173831.56	-764128.83***	148429.61	-178663.20***	33442.92	36036.77	39997.10
inflacao	5.20	2.85	-421.52***	79.75	-340.27***	93.85	-40.17	54.11	71.66	46.57
basilindex_x_selic	-63.66***	19.18	-1938.17***	925.20	915.14	1121.03	-829.45***	179.16	69.98	354.80
leverage_x_selic	-4.45	3.37	-507.23***	287.42	-78.39	199.22	72.88**	36.94	33.90	127.46
imobilization_x_selic	11.88	32.45	4184.57***	2020.44	-101.92	1005.54	1203.71***	326.16	81.68	278.86

Whole Sample (2003-2009)	All Loans	Discountable	G&A	Overdraft	Vendor	Working Capital
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real	carteira_ativa_real
taxa_real	-1.989*** (0.107)	-0.880*** (0.0316)	0.434 (0.388)	-1.359*** (0.290)	0.616*** (0.217)	0.197 (0.506)
maturity	6.107*** (0.291)	1.516*** (0.218)	3.084*** (0.244)	-0.0906 (5.493)	2.257 (2.060)	2.299* (1.298)
has_collateral	117.8*** (12.33)	-8.513*** (3.126)	3.018 (14.34)	229.0*** (46.50)	-42.44 (68.45)	111.8** (55.26)
inflacao	6.451** (2.851)	-2.162*** (0.547)	6.976 (6.026)	1.242 (18.70)	4.115 (3.588)	-5.839 (15.71)
l_inflacao	-9.728*** (2.887)	1.595*** (0.553)	-4.852 (5.903)	-22.62 (18.85)	-3.559 (3.560)	-1.956 (16.14)
pibgrowth	-398.2*** (118.6)	-24.51 (22.40)	640.8*** (247.2)	-2,271*** (772.1)	263.4 (166.2)	-1,118* (669.2)
l_pibgrowth	330.1*** (113.2)	49.23** (21.29)	-686.7*** (238.8)	1,535** (724.2)	-198.9 (166.0)	1,249** (633.6)
big	55.96*** (5.517)	-32.03*** (1.287)	79.93*** (14.19)	1,323*** (72.39)	-9.030 (7.093)	206.9*** (34.37)
export	26.13*** (3.028)	15.43*** (0.595)	3.316 (6.893)	10.13 (18.82)	26.58*** (6.965)	46.04** (19.58)
young	32.29*** (5.083)	-5.134*** (1.153)	23.78** (10.77)	-30.07 (62.12)	-25.72* (14.48)	-9.413 (31.81)
num_loans_per_firm	-0.000254*** (3.58e-05)	-0.000108*** (6.27e-06)	0.000134 (0.000225)	-0.00372*** (0.00101)	0.000597* (0.000352)	-0.000483 (0.000763)
has_bndes_loan	10.38*** (3.073)	-16.46*** (0.618)	-19.78*** (6.932)	-45.36** (21.77)	16.74*** (5.522)	27.22* (16.17)
has_internal_funding	-20.29*** (4.566)	-1.859** (0.914)	21.05** (10.35)	78.63*** (30.01)	9.484 (9.069)	-96.65*** (21.76)
is_manager_educated	11.51** (4.892)	3.923*** (1.003)	8.641 (13.37)	45.55* (27.50)	19.59** (9.924)	40.32* (24.29)
is_public_listed	23.27*** (4.947)	45.13*** (0.955)	14.11 (16.57)	954.0*** (66.73)	151.2*** (11.76)	103.3 (64.18)
is_manager_owner	-2.072 (3.825)	2.449*** (0.799)	11.15 (8.711)	289.8*** (33.50)	-13.92 (9.236)	-29.68 (20.34)
has_collateral_x_selic	-1,045*** (131.1)	117.1*** (34.14)	-39.57 (147.1)	-2,407*** (482.7)	1,374* (808.8)	-599.4 (629.3)
Constant	63.36*** (7.646)	23.45*** (1.586)	-101.6*** (22.39)	129.2** (54.77)	-41.15*** (12.74)	80.39* (43.40)
Observations	59,408	41,755	1,107	1,867	2,040	3,933
R-squared	0.030	0.089	0.221	0.377	0.137	0.027

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Based on Authors Calculations.

ANNEX 2. CONSUMER ACCESS TO CREDIT

A2.1 **As seen in previous chapters, growth in overall credit in the Brazil stemmed from a range of factors.** They include macroeconomic drivers, a changing incentive framework for banks, government policies, and legal and regulatory reforms. These factors combined—often in a mutually reinforcing way—to boost credit from diverse sources to a wide range of borrowers. We review the evolution of the use of financial services and then consider credit growth along the extensive margin, capturing increases in the supply of financial services in new locations or via new products that extend credit to new borrowers. We then look at credit growth along the intensive margin, capturing the rise in borrowing levels due to more attractive loan terms.

Extensive Margin

Commercial banks

A2.2 **As mentioned in Chapter 1, commercial banks have extended their presence significantly, opening branches in previously underserved municipalities.** This decentralization was seen across both private and public banks, although evidence of substitution between public and private banks suggests that Caixa Economica Federal and Banco de Brasil—, the largest public banks—sought to fill gaps not met by private banks (Kumar 2005). Private banks in particular focused expansion efforts in the Northern and Northeastern states, where income growth was stronger than average, even though household incomes are low. A recent poverty analysis indicates that faster income growth in these regions led to a more than 40 percent decline in extreme poverty rates and a more than 30 percent decline in poverty rates.⁶⁰ Banks sought new customers by targeting the growing middle class.

Branchless banking

A2.3 **An alternative to commercial bank intermediation is correspondent or branchless banking.** In existence since 1979, its impact was minimal until regulatory changes under the 1999 Resolução No. 2640/BC allowed for a broader list of services to be offered, including registering new bank accounts, handling deposits and withdrawals, and collecting bill payments. In the same year, Caixa Economia Federal partnered with the national lottery chain, which had a much larger network that reached into smaller municipalities, to provide financial services through branchless banking.

A2.4 **Several other regulatory changes boosted branchless banking's demand and supply.** In 2000, agents were allowed to set up in locations that already had bank branches, extending access to individuals excluded from banking services due to rationing; the number of registered agents more than doubled in the following two years. An even larger increase resulted when the Central Bank no longer required a license for every contract between clients and agents; instead, agents were only required to register in Central Banks' system. That same year, agents were allowed to handle remittance flows up to certain limits. Today, almost any establishment can be registered as an agent—from lottery outlets to grocery stores. By the end of 2010, 163,569 agents

⁶⁰ Drawing upon IPEADATA information for regional poverty and extreme poverty rates (<http://www.ipeadata.gov.br>).

were registered in the Central Bank’s system. These results suggest that branchless banking has proved effective in reaching poorer and less populated regions that tend to be underserved by commercial bank branches.

Credit cards and overdrafts

A2.5 In recent years, department stores have begun extending credit directly to customers. These lines of credit provide discounts if used within the issuing store. Although the Central Bank does not collect data on debt issued by non-financial institutions like department stores, poor families have increased their credit-card ownership, suggesting this development effectively expanded their access to credit.⁶¹ Brazil’s 2002-2003 and 2008-2009 National Consumption Surveys for household heads show substantial increases in credit-card ownership across all deciles, with particularly high growth among the lower and middle deciles (Table A2.1). Similarly, overdraft credit grew markedly among poorer income groups, while the top two deciles actually shifted away from overdrafts and toward less expensive types of credit.

**Table A2. 1: Access to Credit Cards and Overdrafts Across Income Groups
National Consumption Surveys 2002-2003, 2008-2009**

Income decile	Credit Card Ownership			Overdraft Credit		
	2002-2003	2008-2009	growth rate	2002-2003	2008-2009	growth rate
1	3%	8%	154%	1%	1%	118%
2	5%	15%	174%	1%	3%	144%
3	8%	18%	141%	2%	4%	126%
4	12%	23%	90%	4%	6%	55%
5	17%	28%	60%	7%	10%	40%
6	22%	34%	60%	11%	15%	30%
7	29%	40%	38%	20%	21%	4%
8	37%	49%	32%	30%	31%	4%
9	48%	57%	18%	46%	44%	-4%
10	65%	73%	13%	69%	66%	-4%

Source: IBGE’s National Household Surveys (POFs)

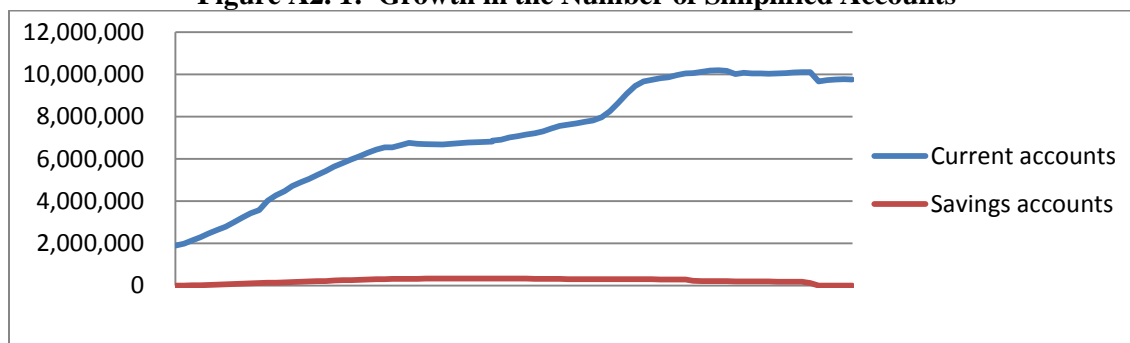
Simplified accounts and Bolsa Familia

A2.6 Simplified accounts were introduced as a means to provide key bank services to the unbanked population. These accounts have been regulated since the early 2000s, but their incidence increased sharply since the inception of the CCT program *Bolsa Familia* in 2003 (see Figure A2.1). Under *Bolsa Família*, transfer payments are made to beneficiaries through simplified current accounts; this proved to be a breakthrough for providing financial services to the poor. The current accounts provide the poor with a simple channel to make and receive payments. They have minimum registration requirements and set a maximum allowable balance, and are exempt from bank administration fees. Banks earn profits by cross-selling other financial and insurance products, and by charging other fees (i.e., transfer fees). With the exception of Bradesco, the main providers of simplified accounts are public banks Caixa Economica Federal and Banco do Brasil, so profits are not necessarily the main economic motivation. Simplified

⁶¹ Moreover, the poor make up the main customer base of these stores.

savings accounts have not been as successful as the current accounts. According to anecdotal evidence, the savings accounts lag for several reasons: (i) it is more difficult to earn profits by charging other fees in savings accounts, (ii) funding costs are higher than interest paid on savings' balances in the absence of administration fees, and (iii) poorer individuals do not have the culture of savings through a banking institution, still withdrawing most of the money to keep it at home when cash-transfers are paid.

Figure A2. 1: Growth in the Number of Simplified Accounts



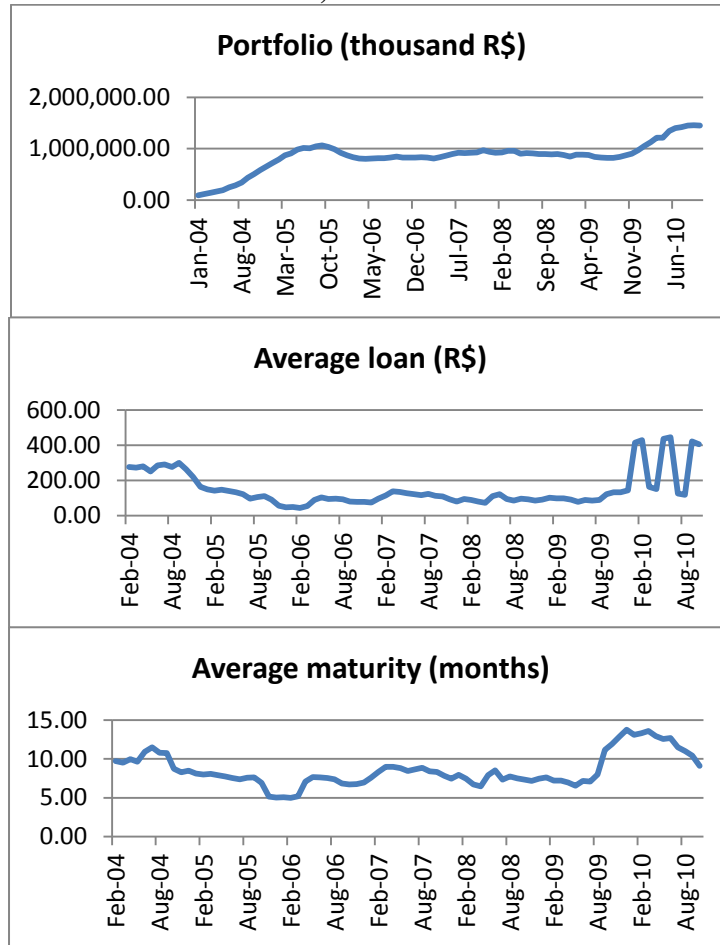
Source: Central Bank of Brazil

Intensive Margin

Micro-finance

A2.7 Since Law 10735 was introduced in 2003, commercial banks must channel 2 percent of their demand deposits to micro-credit, either directly through micro-loans or indirectly through transfers to micro-credit institutions and acquisition of micro-credit portfolios. Any portion not allocated is retained by the Central Bank at zero interest. This significant disincentive is in practice very weak, and about 50 percent of total micro-finance resources sit at the Central Bank. The total micro-credit portfolio has remained modest, although some uptick was seen in the aftermath of the economic crisis (see Figure A2.2). Banks are dissuaded from offering this type of credit due to interest rate caps and the high associated monitoring costs, especially given the perception of high risks of fraud and default linked to a granular portfolio. And consumers are put off by the low credit amounts and very short maturities compared to alternative sources of financing. A third explanation for the low use of micro-credit stems from constrained availability and diversity of long-term funding for micro-finance institutions. They cannot issue bonds but rather must rely on credit lines from commercial banks or from international donors. Because it receives priority funding from FNE, Crediamigo is much better positioned than traditional financial institutions to provide micro-credit loans. To overcome the perception of high risk, the IFC attempted in 2007 to provide insurance to allocate at least the mandated 2 percent of demand deposits, but the proposal was not well received, even by large financial institutions. Due to a lack of administrative capacity to supervise micro-credit loans, small financial institutions specializing in micro-credit bundle loans together, selling them on to a larger institution. Nevertheless, the small institutions' viability is due to their capacity for "going after the clients" and generating micro-credit loans through bank agents. However, the crisis affected many small scale banks, and the Central Bank intervened to rescue a couple of them from bankruptcy.

Figure A2. 2: Microcredit Portfolio, Loan Size and Maturities for Micro Firms



Source: Central Bank of Brazil

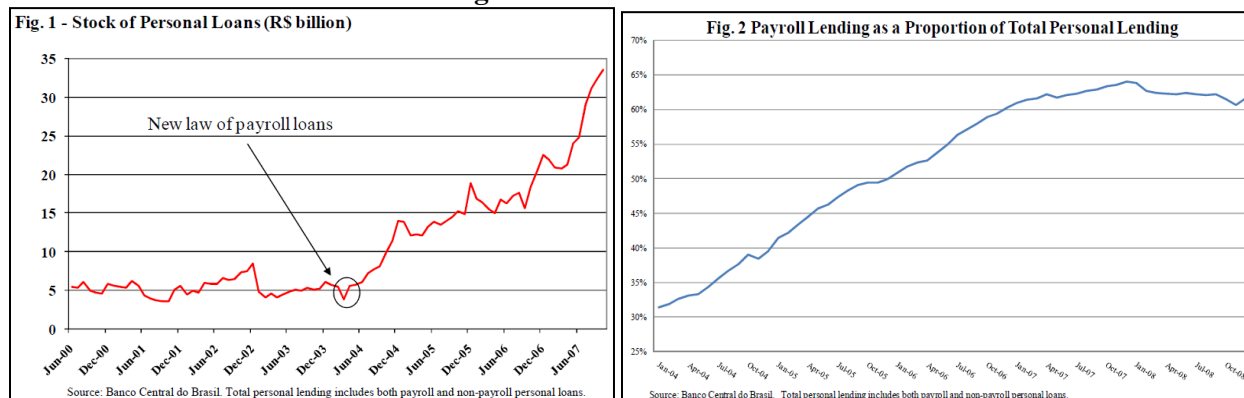
A2.8 Lending to small firms has been similarly limited, particularly by short maturities. As a result, these firms are constrained to using credit to finance working capital rather than to invest in expanding capacity.

Payroll loans

A2.9 Since 2004, payroll loans have been the fastest Brazil’s growing credit mode, representing the most important financial innovation of the past decade. By yearend 2010, payroll lending reached R\$90 billion. Recall from Chapter 3 that payroll loans were restricted to state-level public servants prior to 2003, but new regulations extended the program to formal private employees and retirees starting in 2004 (see Figure A2.3). This eliminated a large part of the “moral hazard” and “hidden information” risks, leaving mostly only individual idiosyncratic risk (e.g., death). Among other things, the legislation mandates that up to 30 percent of the monthly wage/benefit is deductible and that lending banks must be registered with and authorized by the National Social Security Institute (INSS). INSS beneficiaries (i.e., private-sector retirees) constitute the largest share of payroll lending, representing around 50 percent in

2008.⁶² Because debt service is linked to payroll deductions, enforcement costs are low, translating into lower interest rates and longer maturities, thus improving loan access and terms (see Figure A2.4).

Figure A2. 3: Personal Loans



Source: Coelho et al. (2006)

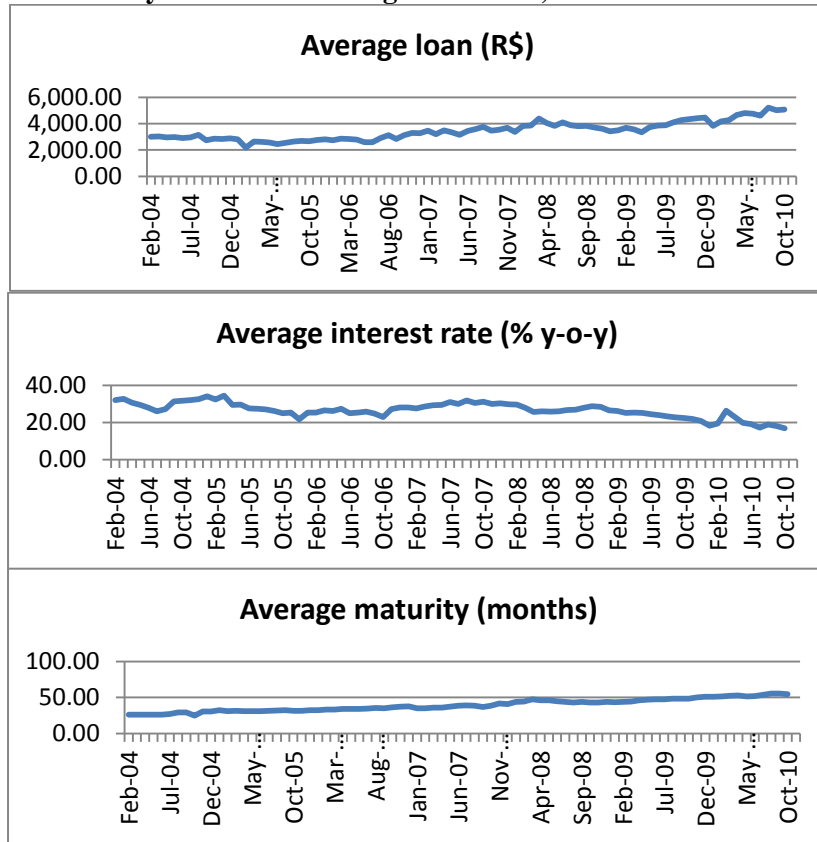
Collateralized loans

A2.10 The types of credit that currently lead consumer credit growth are collateralized loans such as car loans (up 49 percent in 2010) and mortgages (up 63 percent in 2010). However, the mortgage market remains small; it accounts for only 7 percent of total credit (3.5 percent of GDP). In Chile, by contrast, the mortgage market accounts for 18 percent of GDP. Historically, Brazil's mortgage market has been plagued by high interest rates, financial instability, short maturities, and legal uncertainty (such as difficulty in foreclosing on mortgages, as discussed in Chapter 3). But recent changes in legislation are partly responsible for the observed growth in mortgages.⁶³

⁶² Extending the credit to formal private sector employees involves higher risk and enforcement difficulties when borrowers leave jobs, and it gives rise to adverse selection.

⁶³ Deutsche Bank report.

Figure A2. 4: Payroll Loans: Average Loan Size, Interest Rate and Maturity



Source: Central Bank of Brazil

A2.11 In sum, aggregate consumer credit growth is driven by the rising incomes that accompany strong economic growth. This spurred an increased demand for credit that was partly met by better access to financial services (i.e., through expanding bank branches, remote banking, credit cards, and simplified accounts) as well as by a range of instruments (i.e., through microfinance and payroll loans). New products facilitated by the Central Bank to promote the expansion of non-earmarked credit increased the supply of credit. The expansion in payroll loans, for example, contributed to the overall increases in credit.